

**Factors Influencing Nutritional Status of
Preschool Children from Selected Areas in
Five States of India**

A study supported by : International Health Policy Program, Washington D.C., USA

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**FACTORS INFLUENCING NUTRITIONAL STATUS OF
PRESCHOOL CHILDREN
FROM SELECTED AREAS IN FIVE STATES OF INDIA**

MARCH 1997

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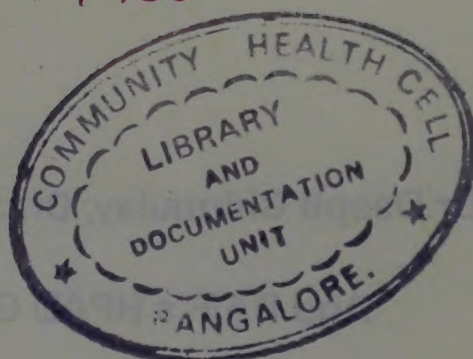
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PREFACE :

Malnutrition among children has been long identified as a key area for action. The problem though universal is not however, monolithic. Grassroot experience has indicated considerable variation in prevalence levels by age, by gender, by community-groups as well as by economic classes. The pattern however, is not simple as it depends not just on food availability but also on awareness, social conditions and cultural practices. Very complex relationships are thus observed. The existing and historical patterns have to be further studied in the light of emerging trends influenced by development activities and a changing socio-cultural environment.

The HPAD group in BAIF has approached the problem with the above broad perspective. An extensive study carried out across five spread out locations and denoting diverse social, cultural, economic and environment settings, has given a wealth of data. Insights gained on the Nutrition status and trend, have yielded important policy implications. Recommendations are presented which have a direct bearing on, 'focusing on critical areas' and fostering observed positive trends'.

A few important observations stand out. These relate to criticality of certain age groups; the importance of awareness and education, especially among women; the declining gender-differentials; the vulnerability of specific caste groups and the complexity of their problems, and above all, the importance of integrated, holistic development. The observations and recommendations have an interesting simplicity about them. But then, Truth is simple, and life is holistic !

I trust policy makers and development planners would find the study of considerable use in shaping development policy and programmes in the coming years.

Only through broadening the network of interest in this area of study and action, will we collectively be able to make a larger impact. We invite organization and individuals to further analyse our observations in the light of their experience, and to send us their comments. We also welcome collaboration with organizations in further action based on the study.

ACKNOWLEDGEMENT

The BAIF Health Policy Analysis and Development Group would like to sincerely thank the following :

The International Health Policy Program (IHPP), Washington D.C. for their support and for having made it all possible,

The families in our study areas for their whole-hearted participation, for tolerating our lengthy questions, and for being hospitable at all times,

All our research advisors in India for their valuable guidance at the various stages of the study,

The BAIF Management and associate societies in the five states -BIRD (K), MITTRA, GRISERV, BIRD (UP), RRIDMA - for guidance and support throughout the period, and

The advisors' team at the School of Nutrition Science and Policy, Tufts University for a new perspective in analysing and interpreting the results, and thus helping us over the last and the most crucial leg.

FACTORS INFLUENCING NUTRITIONAL STATUS OF PRESCHOOL CHILDREN FROM SELECTED AREAS IN FIVE STATES OF INDIA

Executive Summary

Malnutrition in preschool children remains a significant problem in India, despite over twenty years of specific effort like implementation of Integrated Child Development Scheme (ICDS), and more global efforts for improving Maternal and Child Health (MCH) through Primary Health Care (PHC). The high rates imply a large number of preschoolers to be at risk of dying and worse still, growing up to be adults with lesser productivity, with its direct link with development potential.

Several individual and family characteristics are identified to be associated with good child nutrition and health. However, less attention has been directed at the regional differences, combinations of background factors and factors influencing nutritional status in different age groups.

A cross sectional study was undertaken by BAIF Development Research Foundation (a voluntary organization in India), supported by the International Health Policy Programme (IHPP), Washington D.C. in the summer of 1994. The study was done in five selected rural areas from Uttar Pradesh, Rajasthan, Gujarat, Maharashtra and Karnataka states in India.

The study examined links between the socio-economic background of the household and the preschool child's nutrition, and compared patterns of background factors influencing child nutrition in the five areas studied.

The quantitative socio-economic, demographic data was gathered with the help of structured schedules for over 3000 families from each area, and preschool children from these families were measured for anthropometric data. This was followed up by Focus Group Discussions, key informant interviews and in depth interviews with parents. In each area 20 parents of both, well nourished and severely malnourished girls and boys were interviewed to understand child feeding practices.

Our main findings are :

1. High prevalence of malnutrition in all the areas studied. The proportions of preschool children with Z scores less than -2 for weight-for-age range between 58.5 to 73.1; that for height-for-age(stunting) between 44.1 to 63.7; and weight-for-height (wasting) from 21.2 to 37.6%. The rates are particularly high in Raila, Rajasthan and Karchhana, U.P. ICDS activities are absent in both these areas.
2. The prevalence of severe malnutrition (<60% standard weight-for-age) in both girls and boys, greatly increases immediately after the age of six months, and remains high throughout the toddler age group.
3. There is no evidence of discrimination against girls in any age group, or social or economic group.
4. When influence of economic or social factors in the household is controlled for, joint family background is advantageous only in one area - Karchhana, U.P.; where as larger family size has negative influence in a single area - Garag, Kamatak.
5. Significantly higher prevalence of malnutrition is found in children belonging to Scheduled Caste (SC) and Scheduled Tribe (ST) households. In our qualitative observations, we have noted that PHC staff belonging to higher castes are reluctant to visit Scheduled Caste households for the purpose of providing immunizations and other primary health services in Karchhana, U.P.
6. Between 63% to 81% percent of severely underweight children belong to families not reporting any food shortage.
7. Education of adult member in the household, at least above the primary level significantly improves child nutrition. Either of the two, education in adult male or adult female in the household, have significant correlation in each area. The two educational levels are correlated, beta ranging between 0.306 in Karchhana, U.P. and 0.632 in Gandevi, Gujarat.

NUTRITIONAL STATUS OF PRESCHOOLERS IN FIVE STUDY AREAS IN INDIA, 1994

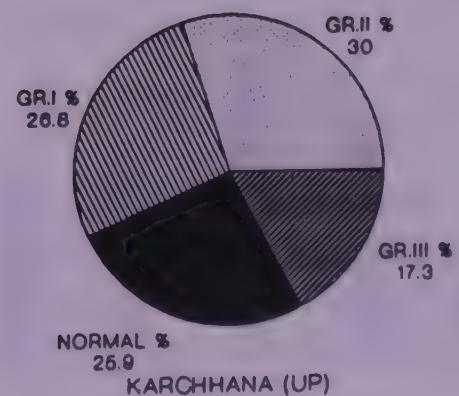
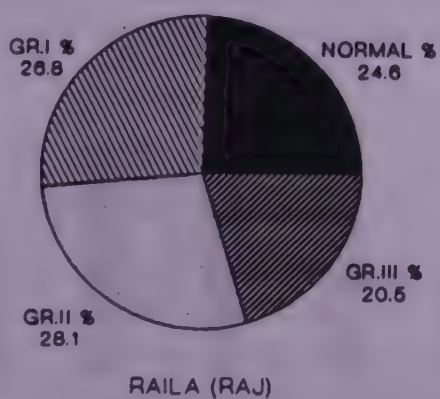
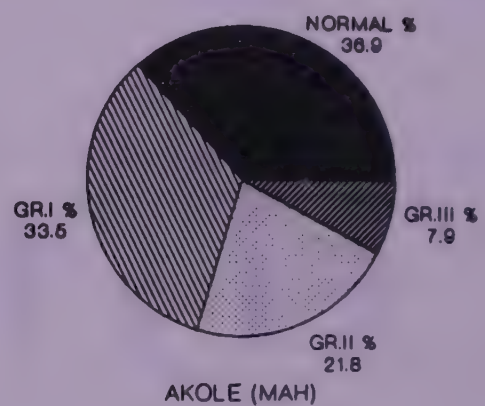
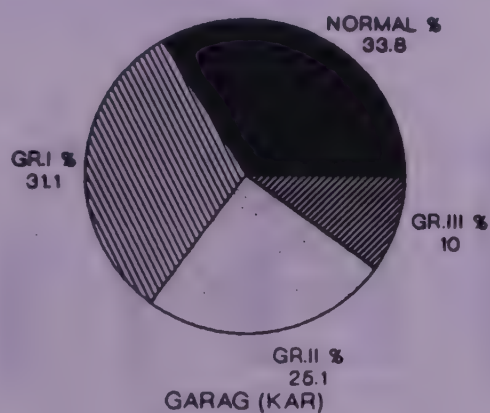
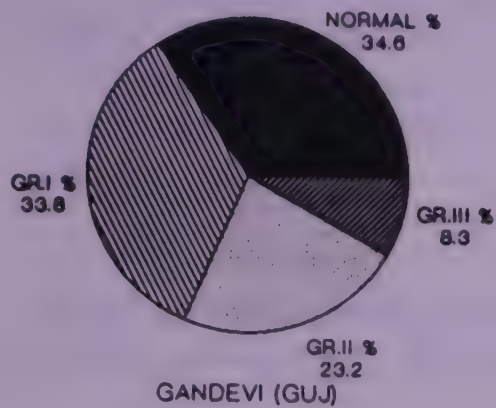
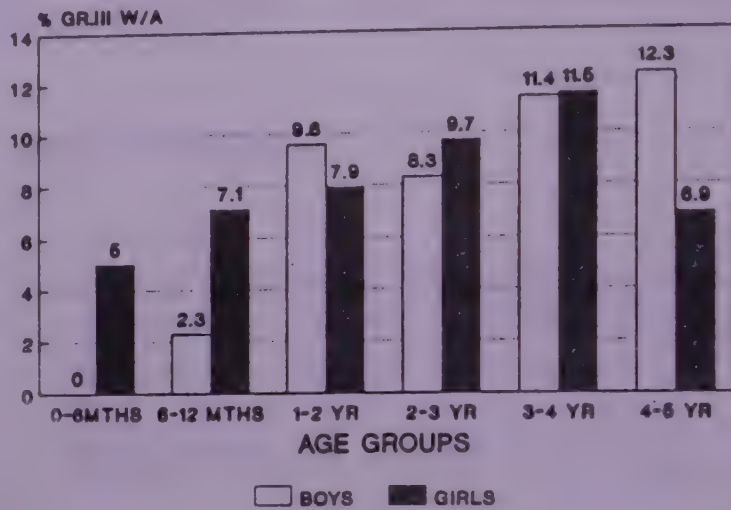


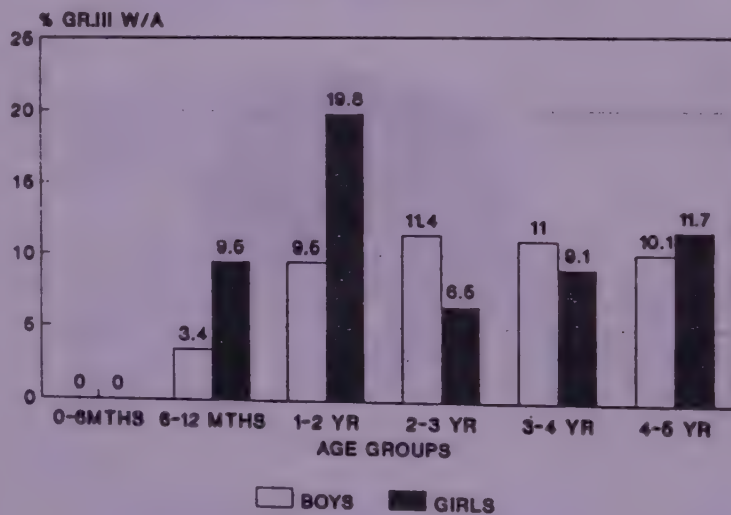
FIGURE 1

SEVERE MALNUTRITION IN BOYS AND GIRLS IN DIFF. AGE GROUPS

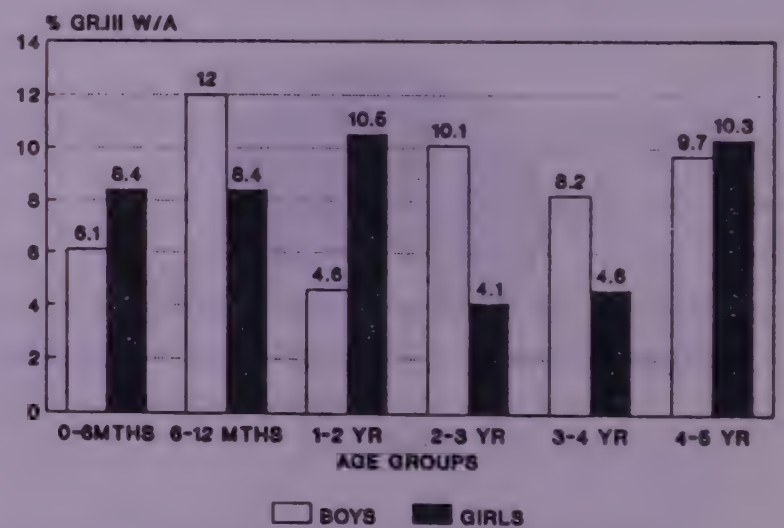
GANDEVI (GUJARAT)



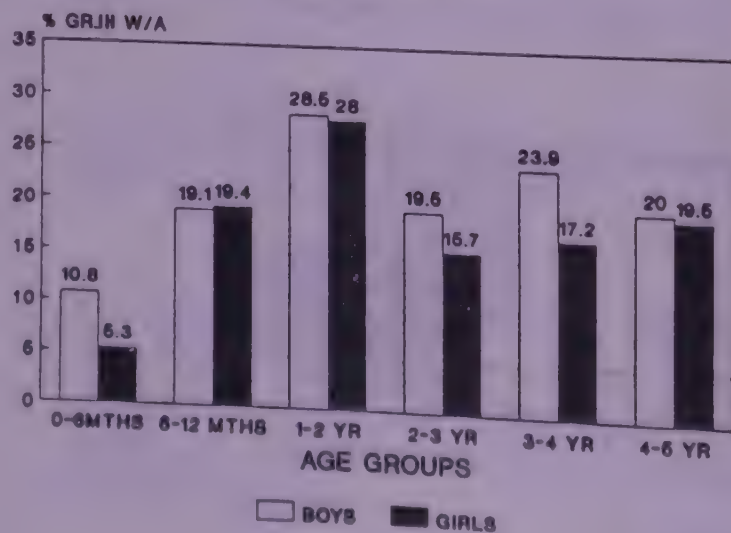
GARAG (KARNATAKA)



AKOLE (MAHARASHTRA)



RAILA (RAJASTHAN)



KARCHANA (UTTAR PRADESH)

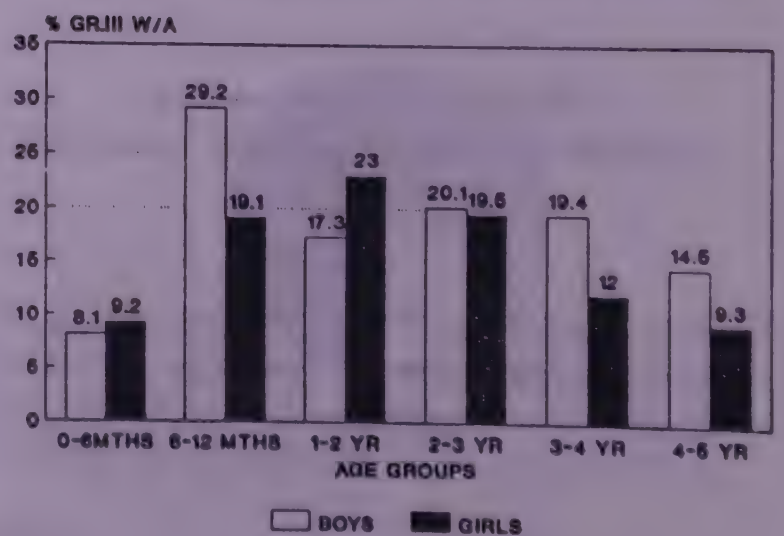


FIGURE 2

8. Comparison between prevalence of malnutrition in the five areas shows that lower the coverage with complete primary immunization, higher is the prevalence of severe malnutrition (Less than 60% of standard weight for age).

In Gandevi (Guj.) where nine out of ten, one to two year children had received complete primary immunization, the prevalence of severe malnutrition in preschool children was 8.3%. Whereas in Raila (Raj.) barely one in ten, one to two year children had received primary immunization and the prevalence of severe malnutrition was 20.5% in preschool children.

9. Use of potable drinking water source by the household is positively related with good nutrition in two areas, Karchhana, U.P. and Garag, Kamatak.
10. Breast feeding is a universal practice in all the five areas. Irrespective of caste and economic class, introduction of supplementary solid foods is delayed up to one year of age in all the areas.

Our recommendations thus are :

1. Complete mapping of the state for prevalence of malnutrition should be done by the government. The maps should be up-dated periodically, to **identify the areas representing pockets of severe malnutrition** in preschool children; and nutrition programmes should be targeted on such areas.
2. Rise in the levels of malnutrition in the second half of infancy and high levels up to two years of age suggest **'timely introduction of supplementary solid foods'** to be of crucial importance in prevention of malnutrition.

Concentrated efforts for educating rural households about the need, the ideal age, process and foods to be used for supplementary feeding of a young child, should be undertaken by the Health Services and Health Education departments.

3. **Availability of low cost, energy dense supplementary solid foods should be ensured**, to aid working mothers in rural nuclear families (majority agricultural labourers). This will ensure adequate nutrition in children below three years, belonging to families with working mothers. This can be done through promotion and establishment of local women's enterprises for production of these foods.

4. **Universal availability of potable drinking water to all rural households should be ensured as soon as possible to achieve reduction in the problem of malnutrition in children linked with water borne infections.**
5. **Increasing reach of Primary Health Care services to remote and poor SC / ST hamlets should be planned for to ensure universal immunization, and to mitigate the ill-effects of recurrent infections on child nutrition. This will also ensure repeated contact with primary health care personnel which helps in raising health awareness.**
6. **Aanganwadis (ICDS Centres) can be up-graded to become day-care centres for rural children. These can serve thus dual purpose of delivery of targeted nutrition inputs, nutrition education and essential child care support lacking in the rural, poor nuclear households.**
7. **Education above primary level should be made available and accessible for both boys and girls, especially from SC, ST and poor households, in the rural areas.**
8. **Since severe malnutrition is found to be significantly higher in poor families belonging to Scheduled Castes (SC) and Scheduled Tribes (ST) targeting of nutrition interventions should be done to reach children from these households.**
9. **Associated problems like poverty (reflected in reported food-shortage, need for borrowing and migration for survival), lack of gainful livelihood opportunities (landless labourers) and very low levels of education especially in women, need to be addressed simultaneously with child nutrition programme, to have sustained impact on the problem of malnutrition.**

SUMMARY OF RECOMMENDATIONS :

	RESULT	RECOMMENDATION
1.	High prevalence of malnutrition.	Regular mapping for nutritional status, and targeting of nutrition interventions to these areas.
2.	Sharp rise in severe malnutrition after the age of six months.	Supplementary solid foods : Education & Awareness for timely introduction, Ensuring availability through local production, Targeting nutrition programmes to under three age group.
3.	Use of safe drinking water source contributes to child nutrition in two areas.	Ensure universal availability of potable drinking water especially in remote hamlets and SC/ST settlements.
4.	Prevalence of malnutrition lower in study areas with higher levels of coverage with primary immunization.	Improve reach of Primary Health Care services, both preventive and curative, especially to remote hamlets and SC/ST settlements.
5.	Joint family background useful for better child nutrition.	Develop child care facility in the villages, especially for working mothers from nuclear families.
6.	Education in an adult family member, either man or a woman, is associated with better child nutrition.	Ensure universal availability and access to above primary level of education for both girls and boys.
7.	Higher levels of severe malnutrition in children from SC or ST and landless households.	Emphasis on participation by children from SC or ST households in the nutrition programmes, Ensure livelihood opportunities for SC / ST and landless families.

SOCIO-ECONOMIC CLASS AND CHILD CARE SITUATION
IN FIVE STUDY AREAS IN INDIA (1994)

Study Area	Higher Socio-Economic Class	Lower Socio-Economic Class
Gandevi (Guj.)	<p>Large irrigated landholding, orchards, large Pucca house, dairy, number of assets, educated mother at home.</p> <p>Children taken to Paediatricians for advice.</p> <p>Supplementary solid foods started around six months.</p>	<p>Landless, labourers, small huts, migration, no education, early pregnancy and less spacing between deliveries, working mothers.</p> <p>PHC or Private Doctor consulted for illness.</p> <p>Supplementary feeding starts around one year.</p>
Akole (Mah.)	<p>Larger irrigated landholdings, cash crops, dairy, higher education, non-working mothers, joint families.</p> <p>Preventive Health Care in pregnancy and immunization done.</p> <p>Supplementary feeding around six months. Special ceremony before solids are introduced.</p>	<p>Landless or very small landholding on hill slopes, labourers, food shortage, migration and circular movement for survival, illiteracy.</p> <p>Treatment from PHC in serious illness only.</p> <p>Cannot afford milk hence start supplementary feeding after one year.</p>
Garag (Kar.)	<p>Large irrigated landholdings, large well constructed house, joint families, cash crops, dairy, mother at home.</p> <p>Private practitioners consulted early in illness.</p> <p>Can afford and use milk, milk products, semi-solid snacks, biscuits and fruit for child feeding.</p>	<p>Small rainfed plots of land, staple crops, poor housing condition, illiteracy, nuclear families, working mothers, labourers, food shortage common.</p> <p>Preventive care frequently not taken.</p> <p>Cannot afford milk or other supplementary foods.</p>

Study Area	Higher Socio-Economic Class	Lower Socio-Economic Class
Karchhana (UP)	<p>Large landlords, irrigation, moderate farm and domestic assets, higher caste, dairy, some education in women, 'Pardah'/Covering of face by women followed.</p> <p>Prefer private modern medicine practitioners.</p> <p>Special ceremony for starting supplementary feeding.</p>	<p>Landless, labourers, no assets, poor housing & sanitation, Scheduled Caste, illiterate women.</p> <p>Private practitioners preferred but not affordable hence late treatment.</p> <p>Supplementary feeding late not until complete stoppage of breast feeding.</p>
Raila (Raj.)	<p>Irrigated plots, animal husbandry, permanent jobs, industry, common property ownership, literacy in male members, higher castes.</p> <p>Strong belief in Traditional Healers, modern care sought.</p> <p>Supplementary feeding started after one year.</p>	<p>Small piece of non-irrigated land, labourers, nuclear families, mother forced to seek work outside home, food shortage and migration for survival common.</p> <p>Resort to magico-religious practices for care in illness.</p> <p>Supplementary feeding very late.</p>

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FACTORS INFLUENCING NUTRITIONAL STATUS OF PRESCHOOL CHILDREN FROM SELECTED AREAS IN FIVE STATES OF INDIA

In India, several programmes aimed at community development, seek to improve the Quality of Living (QOL) of the people. One measure of the QOL is an individual's wellbeing or 'Health', which is largely determined by the nutritional status of the person.

The nutritional status of an individual is a result of several factors acting together. It is influenced by the foods available and consumed, whether the body is able to digest, absorb and assimilate it, and whether the available energy is used for maintaining and achieving growth or for resisting infections.

'Nutrition' influences development through its effect on an individual's productivity, and in-turn gets affected by the development itself, through the production, food security pathway. (Fig.1) Special efforts and specific inputs are necessary to break the vicious cycle of 'Poverty- Under-nutrition'.

For ensuring good nutritional status at both individual and community level, equitable growth and effective social security are essential. Neither one of these two, alone is sufficient for achieving adequate nutrition and nutritional status. Thus good nutrition is both the ultimate goal and the means for achieving the sustainable or equitable development, aimed at through the planned intervention programmes.

The nutritional status of an underfive child although not synonymous with the growth, is often measured in terms of actual body measurements a child has achieved (Anthropometry). Child growth being in a dynamic state, is sensitive to macro-economic, environmental, and at the micro-level, intra-family socio-economic situations. Measurement of preschool children's nutritional status can thus provide very good indication of variable influences of these situations or factors and serve as indicator of impact of development programmes.

REVIEW OF LITERATURE

Nutrition - Development links :

The nutritional status of the preschool children has been a subject of interest and intensive research, over several decades. It has been used as an indicator of impact for analysing food, agriculture and related economic policies. Causation of malnutrition and its effects on human development have been investigated in depth. The plethora of available research serves to highlight the importance and complexity of this subject.

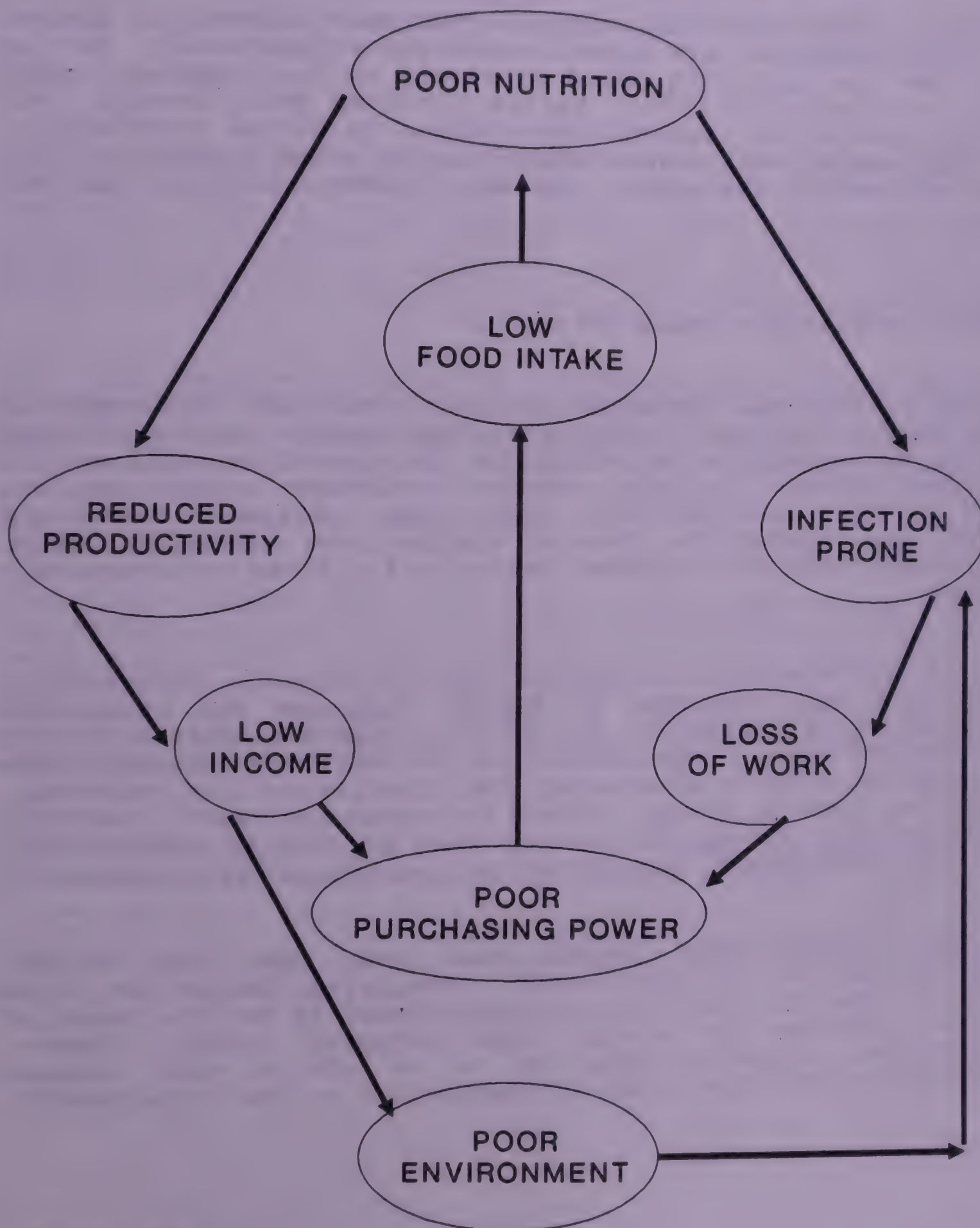
Review of several country programs (Botswana, Brazil, Costa Rica, Dominican Republic, Gambia, India, Indonesia, Philippines, Thailand, Tanzania, Zimbabwe) and policies by ACC\SCN has revealed trends of 'decreasing prevalence of underweight' (in under five years old). The ACC\SCN has postulated this to be as a result of progressive action in several sectors such as Food, Health Services, Education, together. The recent report from UNICEF too highlights the need for multi-sectoral action for effective reduction in the problem of malnutrition.

Even at micro-level, Eileen Kennedy has shown that increments in household income result in some improvements in preschooler nutritional status (as measured by growth) via the income - household calorie - child calorie route.

Studies in India about impacts of Agricultural or Dairy development have brought out conflicting results. Despite improved incomes no positive change like reduction in child morbidity or mortality was noted in Punjab after the Green Revolution. Dairy development and availability of market channels for milk marketing in Gujrat has actually resulted in reduced milk consumption and non-availability of products like butter-milk to poor families, with negative effects on nutrition of children under five years.

As against this in India, integrated programmes including supplementary feeding, for improving preschool children's nutrition like Integrated Child Development Scheme (ICDS) and Tamil Nadu Integrated Nutrition Program (TINP) have demonstrated positive impacts on child nutrition.

NUTRITION - DEVELOPMENT LINKS



(Figure 1)

Direct link of income with child nutrition is often weak. Since income alone is not enough to influence incidence of illness in a child; while infections have a direct negative effect on nutrition. The child care practices play an important role in the process.

Available literature also suggests that mere increase in income does not translate into better nutrition automatically. Nor is it a must for improving child survival, as demonstrated in the state of Kerala in India. Kerala achieved this through land reforms leading to reduced inequalities in income distribution and high educational levels especially in women leading to high level of health awareness, and easy accessibility of medical care.

Factors influencing child nutrition :

Studies by National Institute of Nutrition (NIN), Hyderabad in India have documented differing average calorie consumption and varying prevalence of malnutrition (in underfive children) in different states in India. Nutrition differs across families based on their land holding, family type, religion, castes and tribes, and occupations. Several studies have documented better nutritional status of children belonging to higher socio-economic classes.

Role of environmental sanitation, and infection - malnutrition links have been explored in detail. Sukhatme has postulated availability of sanitation and potable drinking water to be the limiting factors in eradication of malnutrition. Studies have demonstrated effects of maternal characteristics like awareness, education, working status, access to income and health, on child nutrition. Age groups of children more at risk of malnutrition have been identified, and gender related disparity documented.

Impacts of childhood malnutrition are many and severe. Malnutrition is the significant underlying factor in child morbidity and mortality and is postulated to be the cause of several problems in adults like coronary artery disease. Malnourished children grow up to be adults with reduced productivity potential with its mal-effect on the development.

THE STUDY

Although several factors co-related with Child Nutrition have been documented, analysis examining the relationships between the family level factors and behaviours, and their influence on Child Nutrition is not common. Regional differences in the relative role of these background factors in influencing child nutrition need to be compared for understanding the inter-relations in these factors.

Such an analysis can provide pointers towards possible areas for interventions outside health and nutrition sector for maximizing the health benefits of development programmes. An elucidation of the health development links will aid the process of informed policy formulation, integrating various sectors influencing health and aimed at improving the Quality of Life of the People.

In India where each state is equivalent to a small country, diverse socio-economic, cultural situations and varying infrastructure, communication facilities exist. Definition of these regional differences, relative role of each of the factors, their combined effects on Child Nutrition, is essential for appropriate programme designing.

This study formed a part of a larger study aimed at examining the impacts of socio-economic status on the health status and health related behaviours of rural families. The study concentrated on the nutritional status of the preschool children and examined influences of several household socio-economic factors, individual child's characteristics and inter-relations between these factors.

Comparisons between the five distinct study locations in five states of India, served to enhance understanding of the relative roles and inter-relations of the factors vis a vis the health infrastructure in the area. Qualitative observations and interviews aimed at understanding the reasons for the differences and the similarities.

CONCEPTUAL FRAMEWORK

Several factors influence an individual child's nutrition, through two main paths - food availability and infection. New understanding has brought in the factor of Child Care as an important mechanism acting on both the paths.

Factors in the child, its family and maternal characteristics; directly or indirectly influence these two paths and the Child Care factor. Several of these background factors affecting a child's nutritional status, however, themselves get influenced by the wider reality existing at the community \ socio-economic groups' level. These factors also participate in (negative) feed-back loops among themselves, and tend to cluster as either positive or negative situations in higher and lower socio-economic classes respectively. (Fig.2)

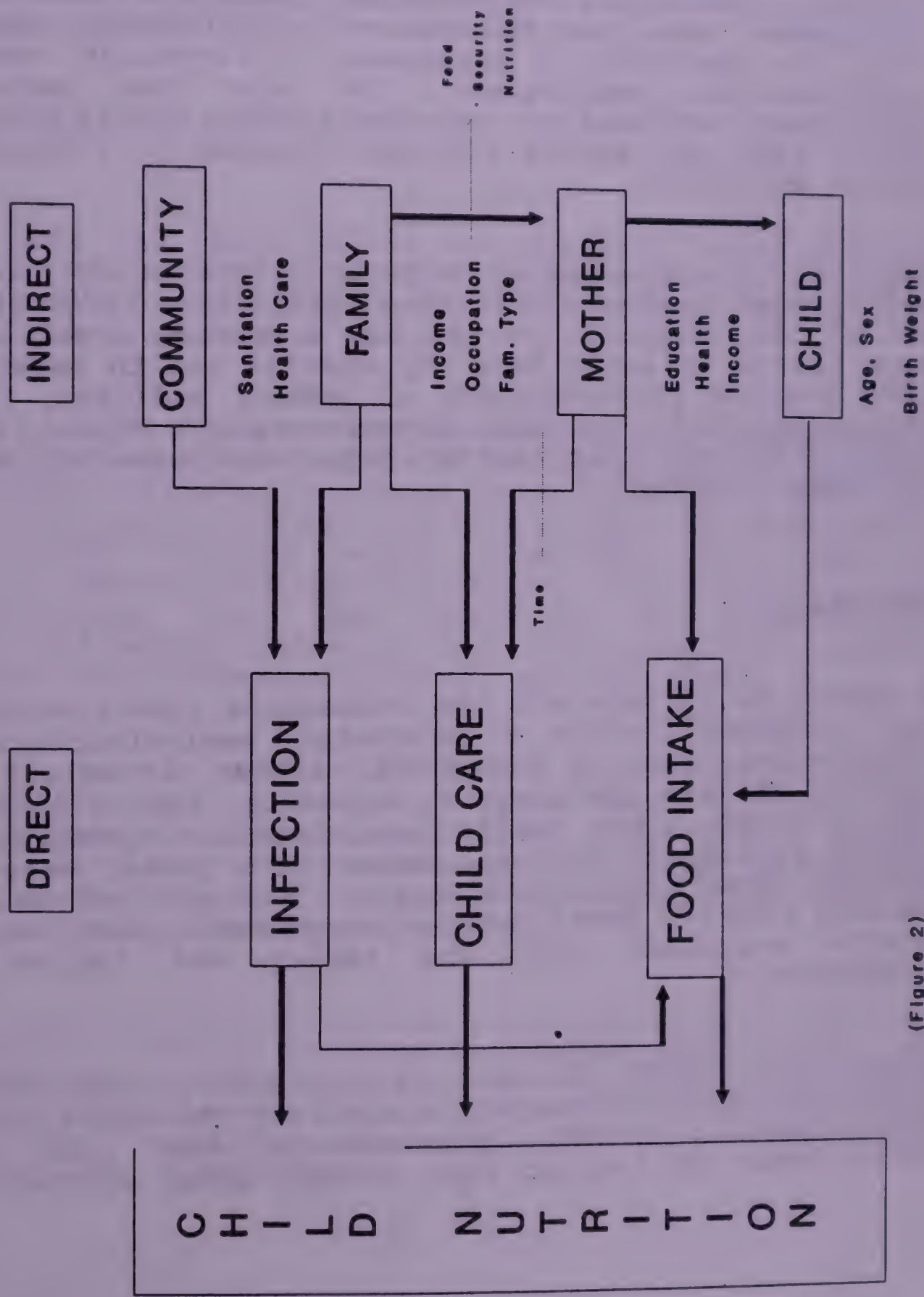
In the broader framework of development, Malnutrition itself, through compromised learning capacity and lower productivity, feeds into a negative feed-back loop.

Some of the factors co-related with Nutritional Status of a child can not be changed, like age or sex of the child, or the caste. The others like income, illness, feeding practices can be changed; and the effect of the former ones reduced by education and modifications in the child feeding practices.

Purpose of this study was thus to concentrate on the social and economic groups and examine influence of these background factors on child nutrition. We undertook dis-aggregate level analysis to study relative role of these factors in different age groups, and examine patterns of background factors in various areas having different health culture and infrastructure.

INTER-LINKAGES BETWEEN FACTORS

INFLUENCING CHILD NUTRITION



(Figure 2)

RESEARCH METHODOLOGY

Data sources :

Data presented in the current paper was primarily collected in selected areas from five states viz. Uttar Pradesh, Rajasthan, Gujarat, Maharashtra and Karnataka. These are the areas where BAIF Development Research Foundation (a Voluntary Organization in India) is operating a programme of livestock development for socio-economic development, for over ten years. Livestock development services are extended through Cattle Breeding Centres (CBC). Each CBC serves villages located in fifteen kilometres radius around it.

Over 3000 families were included in the study from each area. Nearly equal number of villages within five kilometres' distance and at the periphery of the CBC's service area were included. None of the villages have any special health services facility like private practitioners of modern medicine, organizations delivering health services or presence of a Primary Health Centre (PHC) which may bias health status and behaviour of the people in these villages.

Methods :

A survey to include all the households from a selected village was conducted using a pretested semi-structured schedule. Information about a household, either a nuclear or a joint family, for its demographic, economic, social characteristics, health status, and health behaviour was gathered. From each family preschool children (under five years) were measured by trained investigators and Doctors. Age was recorded using birth records with PHC staff (ANM) or Aanganwadi (ICDS) workers, Growth charts available with the family and Indian traditional calendars.

Weight and height of under five child was recorded, for every available child in the village during the three week period of anthropometric survey. Measurements were taken by Doctors, nutritionist or trained ICDS workers using standard equipment.

Qualitative data collected by Anthropologists through observation, group discussions and interviews, was used to document the child care situation in each of the areas. To understand the factors, processes and sequence of events resulting in the current nutritional status of a child; qualitative data was collected through in-depth interviews with mothers and caretakers, for both normal and severely malnourished children from families having different socio-economic statuses. Eighteen to twenty such interviews were taken in each study area.

Analysis :

The primary data was computerized and analyzed using the SPSS software. Epi-info and Epi-nut softwares were used to calculate the Z scores for comparisons with the NCHS standards. The qualitative data was analyzed manually.

For each child, his or her nutritional status was computed in terms of weight-for-age compared to the sex specific standard value. Fiftieth centile of the NCHS standard weights was taken as one hundred percent, and each child's weight was converted to percentage of the standard weight (for age). This then was classified for determining the nutritional status based on the WHO classification i.e. less than 80% of standard as malnourished, of which those having less than 60% standard weight-for-age were termed as severely malnourished.

The Z score values of less than minus two were taken as cut off for malnutrition, and those under minus three Z score were considered as severely malnourished. Besides the weight-for-age Z scores (WAZ) for identifying underweight children; height-for-age and weight-for-height Z scores were computed to identify stunted and wasted children, respectively.

The schedule used for collecting the quantitative data contained several questions for determining the household's social and economic background, health status and behaviours influencing health. Correlations between these variables were examined. Since several of these variables showed significant correlations, factor analysis was undertaken.

Two factors emerged in each state, one a purely agricultural economy based (AE factor), and another socio-economic one related to caste, occupations, domestic assets and education in the family (SE factor). In Raila, Rajasthan however caste contributed more to the AE factor, and due to very low educational levels, education related variables were showing independent grouping leading to a separate Education factor. These factors were then used to examine effect of socio-economic status on the pre-schoolers' nutrition.

Although these factors could neatly group the children according to their families' socio-economic backgrounds; for making policy related recommendations, we needed to examine the independent influence of each of the background factors. Thus variables representing each of these factors, showing adequate variability in all the five study areas, and not having multiple collinearity were selected for inclusion in the regression model.

Specific variables likely to influence nutrition, like source of drinking water (indicating potability), age and gender of the child, family type and size of the household, reported migration and food distress were also examined. Uni-variate and bivariate analysis guided the development of the model for examining the contribution of background factors to the pre-school child's nutritional status.

An identical model was applied to each of the five study areas for the purpose of comparison across the areas.

The regression equation used was :

$$\text{WTFORAGE} = f (\text{MTHAGE}, \text{SEXNUM}, \text{LAND}, \text{ADULTFED}, \text{ADULTMED}, \text{LOWCAST}, \text{SAFEWATR}, \text{FAM_SIZE}, \text{TYPFAML}, \text{MIGRN}, \text{FOODDIST}).$$

Where,

WTFORAGE = Weight of the child as percentage of the sex specific, standard weight-for-age.

MTHAGE = Age of the child in months.

SEXNUM = The child having Male gender.

LAND = Land owned by the household (acres).

ADULTFED = Highest education in adult female members of the household.

ADULTMED = Highest education in adult male members of the household.

LOWCAST = Belonging to a SC or a ST family.

SAFEWATR = Household using either piped supply or water drawn from a bore-well for drinking purposes.

FAM_SIZE = Number of members in the household.

TYPFAML = Joint family type.

MIGRN = Reported migration for survival by any family member.

FOODDIST = Reported food shortage in the household.

RESULTS

Coverage :

As mentioned in the data sources, study was done in a selected cluster of villages from a District in each of the five states of India. These areas and number of households and under five children included in the analysis, are as follows :

Table 1 : Study areas and coverage

STATE	DISTRICT	STUDY AREA	H.H.s	UNDER5s
Gujarat	Valsad	Gandevi	3212	783
Maharashtra	Ahmadnagar	Akole	3005	1402
Karnatak	Dharwad	Garag	3101	1396
Uttar Pradesh	Allahabad	Karchhana	2826	1583
Rajasthan	Bhilwada	Raila	3007	1146

Any analysis and interpretation of the current data set will not be complete without consideration to varying developmental situations in the five study areas. All the areas are rural, and have sizable population of tribals with the exception of Karchhana, Uttar Pradesh which has a large population of Schedule Caste families. These are largely agrarian communities, where landless family members are mainly engaged on the farms of landed as agricultural labourers.

Gandevi area in Gujarat is relatively progressive with rich families owning large land holdings developed as Mango orchards. Literacy levels here are relatively good with sizable number of women having received at least above primary level education. Of the under five children in the study, nearly half (46.7%) belonged to Schedule Tribe families, which have either small or no land holdings. Extension of the Primary Health Care services is good in the area. ICDS activities are implemented in this area.

Akole area in Maharashtra is a hilly area bordering the tribal population belt in the Maharashtra. The population here is mixed with a little less than a third (27.2%) children coming from ST families. Fertile lands used for cash crops like Sugarcane, on the plains or in the valleys are owned by the dominant Maratha households, where as the tribals have small land holdings on the steep slopes. Women from the dominant and other hindu households have some education. Reach of PHC services is fairly good, though tribal households high up on the hills remain un-reached. ICDS programme is operated in the area.

Garag in Karnatak, is a community with strong hold of traditions. Education above primary level is low in women. Only tenth (11.3%) of the children belonged to ST households. PHC and ICDS services are fairly well implemented in these villages. Richer households have cash crops like groundnut and engage in agro-based occupations like dairying. Piped water supply through community taps, based on bore-wells is available to families residing here, however, wealthier households prefer to use their own wells.

Karchhana in Uttar Pradesh is strongly bound with caste system. Scheduled Caste households are located on the periphery of the village with their separate water supply - open wells with very poor sanitation around these. Over a third of children (35.6%) belonged to SC households. Nearly tenth (9.6%) of the children belonged to Muslim households. Educational levels in the women are low. PHC services are not very popular and seeking curative care from a private practitioner is a preferred practice and prestige symbol. ICDS is not operated in the area.

Raila, Rajasthan is a very remote area. Road and other communication infrastructure is poor. Reach of PHC services is very limited, and a strong belief structure makes people rely on traditional healers even for illnesses like typhoid. Agriculture is mainly staple crop of Maize with little vegetable cultivation done on well irrigation. Nearly a third (28.4%) children belonged to SC or ST families. There are no ICDS operations going on in the area.

Table 2 gives the age and gender-wise distribution of the children from each of these areas, included for analysis in the study. There is a good number of children from each age group included in the study. The gender distribution is also even, with no significant differences in proportions of girls and boys covered in any age group.

TABLE 2 : AGE AND GENDER DISTRIBUTION OF PRESCHOOLERS FROM FIVE STUDY AREAS

AGE-GROUP	GANDEVI (GUJ)			AKOLE (MAH)			GARAG (KAR)			KARCHHANA (UP)			RAILA (RAJ)		
	GIRLS	BOYS	TOTAL	GIRLS	BOYS	TOTAL	GIRLS	BOYS	TOTAL	GIRLS	BOYS	TOTAL	GIRLS	BOYS	TOTAL
Under 6mths	40	45	85	36	49	85	34	30	64	76	62	138	38	37	75
%	47.059	52.941		42.353	57.647		53.125	46.875		55.072	44.9		50.667	49.3	
>6 <=12mth	42	44	86	107	108	215	84	89	173	115	113	228	98	110	208
%	48.837	51.163		49.767	50.233		48.555	51.445		50.439	49.6		47.115	52.9	
>1 <=2 yr	75	73	148	153	173	326	126	179	305	165	173	338	118	144	262
%	50.676	49.324		46.933	53.067		41.311	58.689		48.817	51.2		45.038	55	
>2 <=3 yr	93	108	201	169	179	348	154	166	320	164	194	358	153	133	286
%	46.269	53.731		48.563	51.437		48.125	51.875		45.81	54.2		53.497	46.5	
>3 <=4 yr	61	79	140	131	147	278	157	164	321	142	170	312	87	117	204
%	43.571	56.429		47.122	52.878		48.91	51.09		45.513	54.5		42.647	57.4	
>4 <=5 yr	58	65	123	78	72	150	94	119	213	86	124	210	41	70	111
%	47.154	52.846		52	48		44.131	55.869		40.952	59		36.937	63.1	
Total	369	414	783	674	728	1402	649	747	1396	748	836	1584	535	611	1146
%	47.126	52.874		48.074	51.926		46.49	53.51		47.222	52.8		46.684	53.3	

Is malnutrition a major problem ? : Yes.

The five areas included in the study although all rural agrarian societies differ from each other by virtue of the infrastructure, health care facility, and most importantly "culture" of the people. Thus, it was not a surprise when substantial differences were found in the levels of malnutrition between areas. (Table 3a and 3b)

What was more unexpected, however, was the very high levels of severe (weight-for-age <60% of standard or Grade III) malnutrition in Raila, Rajasthan (20.5%) and Karchhana, Uttar Pradesh (17.3%). Proportions of under five children with WAZ less than -3 was 41.9% and 38.3% in these areas respectively. Prevalence of stunting and wasting was also high, with as high as 12.6% wasting in Raila (Raj).

Since malnutrition is so significant a problem, who are the children at risk ? :

Profiles of groups of normal and severely malnourished (grade III) children were examined for each area to identify most significant differences. These are given in Annex 1. Distribution of malnutrition was examined through bivariate analysis, to identify important background factors in the child's household, which could influence the child's nutritional status.

Child Related Factors :

Age :

Infants fared better with lowest proportions of severe (Gr.III) malnutrition in all areas, except in Karchhana (U.P.), where infants also had poor nutrition. (18.31% Gr.III). In Raila (Raj.), even though better, infants still had fairly high levels of severe malnutrition (16.25% Gr.III).

TABLE 3a :

NUTRITIONAL STATUS OF PRESCHOOL CHILDREN IN FIVE STUDY AREAS

STUDY AREA (STATE)	NUTRITIONAL STATUS				TOTAL CHILDREN
	NORMAL %	GR.I %	GR.II %	GR.III %	
GANDEVI (GUJ)	34.6	33.8	23.2	8.3	783
AKOLE (MAH)	36.9	33.5	21.8	7.9	1402
GARAG (KAR)	33.8	31.1	25.1	10	1396
KARCHHANA (UP)	25.9	26.8	30	17.3	1584
RAILA (RAJ)	24.6	26.8	28.1	20.5	1146

WHO CLASSIFICATION :

NORMAL = > 80% Standard Weight for Age

GR.I = >=70% and < 80% Standard Weight for Age

GR.II = >=60 and < 70% Standard Weight for Age

GR.III = < 60% Standard Weight for Age

where

50 th centile of NCHS standard as 100%

.....

TABLE 3b : PREVALENCE OF MALNUTRITION AMONG 1-5 YEAR OLDS
BY STUDY AREAS.

MEASURE OF NUTRI. STATUS	GANDEVI (GUJ)	AKOLE (MAH)	GARAG (KAR)	KARCHANA (U.P.)	RAILA (RAJ)
NUMBER OF 1-5YR UNDERWEIGHT	783	1402	1396	1583	1146
% WAZ < -2	61	58.5	63.6	69.5	73.1
% WAZ < -3	24.6	22.2	27.6	38.3	41.9
NUMBER OF 1-5YR STUNTING	741	1307	1368	1553	1093
% HAZ < -2	44.1	60.3	59.9	63.65	59.5
% HAZ < -3	24.5	38.5	33.4	40.25	37
NUMBER OF 1-5YR WASTING	741	1307	1368	1553	1093
% WHZ < -2	22.2	16.1	18.6	22.7	25.2
% WHZ < -3	8	5	3.7	8	12.6

Severely malnourished infants mainly comprised of children in 6 - 12 months age-group. Babies up to 6 months age were better nourished in all the study areas. Although proportion of severe malnutrition was over 8% in less than six months old from Akole (Mah.), Karchhana (U.P.) and Raila (Raj.).

After the age of six months nutritional status of infants deteriorated. This increase in the proportion of severely malnourished children in 6 - 12 month age-group was statistically significant in Garag (Kar.), Karchhana (U.P.) and Raila (Raj.) areas.

After infancy nutritional status deteriorated in all areas. Baby boys in Karchhana (U.P.) were however different. They had poor nutrition as infants and showed a little improvement between one to three years age. Maximum levels of severe malnutrition were noted in different age groups in different areas. No pattern could be discerned. Table 4 give the varying levels of nutrition in children in various age groups.

Gender differences :

We found no significant discrimination against girls. Prevalence of severe malnutrition in each age group as well as in total preschoolers was compared between boys and girls. No significant difference in the level of malnutrition was observed between total preschool boys and girls, in any of the five areas. Neither were there any significant differences when girls and boys from various caste groups and asset groups were compared (Table 5.1 to 5.5).

In Akole (Mah) however, girls despite having lower proportion of Gr.III as infants showed significantly higher proportion of Gr.III in '1-2 years' age group. In Garag(Kar), though not statistically significant boys were better as infants and '1-2 years' old (Table 4). ANOVA of the differences between boys and girls showed these to be non significant.

TABLE 4 : SEVERE MALNUTRITION IN BOYS AND GIRLS IN DIFFERENT AGE-GROUPS

% GRIII W/A AGE GROUP	GANDEVI			AKOLE			GARAG			KARCHHANA			RAILA		
	(GUJARAT)			(MAHARASHTRA)			(KARNATAKA)			(U.P.)			(RAJASTHAN)		
	BOYS	GIRLS	SIG.	BOYS	GIRLS	SIG.	BOYS	GIRLS	SIG.	BOYS	GIRLS	SIG.	BOYS	GIRLS	SIG.
UP TO 6 MTHS	0.0	5.0	nil	6.1	8.4	nil	0.0	0.0	nil	8.1	9.2	nil	10.8	5.3	nil
INFANTS 6-12 M	2.3	7.1	nil	12.0	8.4	nil	3.4	9.5	nil	29.2	19.1	nil	19.1	19.4	nil
ONE-TWO YR	9.6	7.9	nil	4.6	10.5	*	9.5	19.8	*	17.3	23.0	nil	28.5	28.0	nil
TWO-THREE YR	8.3	9.7	nil	10.1	4.1	*	11.4	6.5	nil	20.1	19.5	nil	19.5	15.7	nil
THREE-FOUR YR	11.4	11.5	nil	8.2	4.6	nil	11.0	9.1	nil	19.4	12.0	nil	23.9	17.2	nil
FOUR-FIVE YR	12.3	6.9	nil	9.7	10.3	nil	10.1	11.7	nil	14.5	9.3	nil	20.0	19.5	nil
TOTAL	8.2	8.4	nil	8.4	7.4	nil	9.2	10.8	nil	17.9	16.6	nil	21.9	18.9	nil

NOTE : * Significant at 5% level.

‡ Gr.III W/A - Proportion of children, less than 60% of standard weight for age.

TABLE 5.1 : GENDER DIFFERENCES IN NUTRITION OF PRE-SCHOOL CHILDREN
GANDEVI (GUJARAT), 1994.

SUBGROUP Based on	Female		Male		Sig. of Difference
	% GR III	(N)	% GR III	(N)	
ASSET HOLDING					
No Assets	12.0	100	11.2	125	NS
Upto Rs.5000	9.8	153	9.0	155	NS
Rs.5-11, 000	3.3	30	6.7	30	NS
Rs.11-100, 000	4.2	72	3.4	89	NS
> Rs.100, 000	0.0	14	6.7	15	NS
CASTES/RELIGION					
Dominant	2.9	139	7.5	161	NS
Higher	20.0	5	0.0	12	NS
Other	4.8	21	6.2	41	NS
OBC	-	1	-	1	-
Scheduled Caste	17.6	17	3.7	27	NS
Scheduled Tribe	12.0	184	10.4	182	NS
WOMAN-EDUCATION					
Less than Primary	12.3	163	9.1	169	*
Primary	7.4	94	12.1	132	NS
Secondary	3.8	79	2.5	80	NS
Graduate/Tech.	3.2	33	3.0	33	NS

Note : * = significant at 5% level

NS = Not Significant

TABLE 5.2 : GENDER DIFFERENCES IN NUTRITION OF PRE-SCHOOL CHILDREN
AKOLE (MAHARASHTRA), 1994.

SUBGROUP Based on	Female		Male		Sig. of Difference
	% GR III	(N)	% GR III	(N)	
ASSET HOLDING					
No Assets	10.9	175	8.0	199	NS
Upto Rs.5000	12.1	140	9.8	143	NS
Rs.5-11, 000	2.8	38	6.5	31	NS
Rs.11-100, 000	4.4	298	7.8	334	NS
> Rs.100, 000	0.0	27	14.3	21	NS
CASTES/RELIGION					
Dominant	5.9	378	5.8	398	NS
Higher	NA	NA	NA	NA	-
Other	0.0	1	50.0	4	NS
OBC	3.8	80	9.8	102	NS
Scheduled Caste	8.1	37	13.0	23	NS
Scheduled Tribe	12.2	180	11.4	201	NS
WOMAN-EDUCATION					
Less than Primary	8.8	411	9.0	429	NS
Primary	5.6	214	7.5	285	NS
Secondary	2.8	39	7.7	28	NS
Graduate/Tech.	11.1	10	28.8	8	NS

Note : NA = Not Applicable as only 12 families belonged to Higher caste.
NS = Not Significant

TABLE 5.3 : GENDER DIFFERENCES IN NUTRITION OF PRE-SCHOOL CHILDREN
GARAG (KARNATAK), 1994.

SUBGROUP Based on	Female		Male		Sig. of Difference
	% GR.III	(N)	% GR.III	(N)	
ASSET HOLDING					
No Assets	11.8	287	9.8	327	NS
Upto Rs.5000	8.0	137	9.8	123	NS
Rs.5-11, 000	11.8	119	8.8	162	NS
Rs.11-100, 000	12.0	83	7.2	111	NS
> Rs.100, 000	4.3	23	12.5	24	NS
CASTES/RELIGION					
Dominant	7.9	318	8.2	384	NS
Higher	11.9	87	7.8	79	NS
Other	18.1	94	14.8	115	NS
OBC	15.4	13	8.3	12	NS
Scheduled Caste	11.1	90	10.2	88	*
Scheduled Tribe	11.8	89	8.7	89	NS
WOMAN-EDUCATION					
Less than Primary	11.2	488	10.8	508	NS
Primary	7.4	149	8.3	190	NS
Secondary	17.8	34	8.1	49	NS
Graduate/Tech.			0.0	2	

Note : * = significant at 5% level

NS = Not Significant

TABLE 5.4 : GENDER DIFFERENCES IN NUTRITION OF PRE-SCHOOL CHILDREN
KARCHHANA (UTTAR PRADESH), 1994.

SUBGROUP Based on	Female		Male		Sig. of Difference
	% GR III	(N)	% GR III	(N)	
ASSET HOLDING					
No Assets	19.8	97	22.2	108	NS
Upto Rs.5000	19.3	471	19.1	518	NS
Rs.5-11, 000	5.9	88	9.0	89	NS
Rs.11-100, 000	9.7	93	18.5	109	NS
> Rs.100, 000	5.3	19	8.3	12	NS
CASTES/RELIGION					
Dominant	8.7	23	12.0	25	NS
Higher	5.0	119	10.2	137	NS
Other	12.0	25	8.8	35	NS
OBC	14.3	237	18.4	287	NS
Scheduled Caste	27.8	283	22.1	289	NS
Scheduled Tribe	0.0	7	60.0	5	NS
Muslims	8.1	74	17.9	78	*
WOMAN-EDUCATION					
Less than Primary	18.3	838	19.7	702	NS
Primary	5.8	88	7.7	91	NS
Secondary	7.1	14	20.0	35	NS

Note : * = significant at 5% level

NS = Not Significant

TABLE 5.5 : GENDER DIFFERENCES IN NUTRITION OF PRE-SCHOOL CHILDREN
RAILA (RAJASTHAN), 1994.

SUBGROUP Based on	Female		Male		Sig. of Difference
	% GR III	(N)	% GR III	(N)	
ASSET HOLDING					
No Assets	25.9	58	20.0	75	NS
Upto Rs.5000	18.3	203	24.5	229	NS
Rs.5-11, 000	21.5	79	20.2	89	NS
Rs.11-100, 000	17.8	182	20.1	204	NS
> Rs.100, 000	30.8	13	28.8	14	NS
CASTES					
Dominant	19.0	128	29.3	133	NS
Higher	18.2	37	21.4	28	NS
Other	17.5	171	18.2	198	NS
OBC	18.2	55	19.4	72	NS
Scheduled Caste	18.8	95	21.2	118	NS
Scheduled Tribe	29.4	51	29.0	82	NS
WOMAN-EDUCATION					
Less than Primary	19.0	517	22.4	588	NS
Primary	21.4	14	4.8	21	NS
Secondary	25.0	4	25.0	4	NS
MALE EDUCATION					
Less than Primary	19.8	359	25.3	440	NS
Primary	19.7	122	14.2	127	NS
Secondary	14.8	41	11.4	35	NS
Graduate/Tech.	15.4	13	11.1	9	NS

Note : NS = Not Significant

After this age (1-2 yrs.) however girls seemed to improve. In Akole (Mah) girls were significantly better than boys as 2 - 4 years old, and in Karchhana (U.P.) as 3-5 years old.

While examining immunization status of girls and boys in different age groups vis-a-vis their nutritional status, an interesting observation came up. Of the girls between 1 to 2 years age groups, those who had received complete primary immunization had significantly better nutritional status in Garag (Kar) (11.4% as against 30.9% severe malnutrition). In Akole (Mah) also similar difference (not statistically significant) was observed. (6.3% Gr.III against 14.9% in un-immunized girls between 1-2 years.) In Karchhana, U.P. significantly higher proportion of boys (43.4%) in the one to two year age group, had received complete primary immunization with the six vaccines, compared to the girls in the same age group (32.1%).

Of the children suffering from diarrhoea or Acute Respiratory Infection (ARI), proportions receiving modern treatment were studied for boys and girls. Although boys were treated in apparently larger proportions in Akole (Mah) and Garag (Kar), the differences were not statistically significant. In Gandevi (Guj) and Raila (Raj) due to small numbers, difference cannot be commented upon, whereas in Karchhana (U.P.), no such difference was observed.

Sickness in the preschoolers :

Incidence of diarrhoea or Acute Respiratory Infection (ARI) in the week preceding investigation was recorded. Any type of treatment sought was also recorded.

Incidence of sickness varies greatly between the five study areas, from 28.3% Karchhana (U.P.), 21.8% in Akole (Mah) to 3.5% in Gandevi (Guj). However, within an area, sickness was not related to any background factor in the child or the family.

Proportion of severe malnutrition was significantly high in sick children in Akole (Mah), Karchhana (U.P.), Raila (Raj) and in children with diarrhoea in Garag (Kar). (Table 6)

Treatment for sickness :

Modern treatment was sought by over 64% in Akole (Mah), 70-80% in Garag (Kar), 60-70% in Karchhana (U.P.). In Raila (Raj) fewer numbers took modern treatment i.e. 28 and 40% of sick children for ARI and diarrhoea respectively.

Modern care was resorted to apparently more when the preschooler was severely malnourished (85.7% in severely malnourished as compared to 61.7% in other cases for diarrhoea, and 76.2% compared to 63.4% for ARI).

In Raila (Raj) proportion of severe malnutrition was lower in cases treated with modern medicines compared to rest of the cases. (18% in diarrhoea and 19% in ARI compared to 25 and 27.6% in all children sick) The difference was not statistically significant. (Table 6).

Immunization :

A trend towards better nutrition was observed in 1-2 years old children receiving complete primary immunization in Akole (Mah), Garag (Kar) and Karchhana (U.P.); especially in girls. This was statistically significant only in Garag (Kar).

In Gandevi (Guj) due to fairly high immunization levels (90.7% in 1-2 yrs.) the difference could not be commented upon. So also in Raila (Raj) where immunization coverage was found to be very poor (10.3% in 1-2 yrs.) (Table 7).

TABLE 6 : SICKNESS IN PRESCHOOL CHILDREN AND SEVERE MALNUTRITION

STUDY AREA	SICK WITH DIARRHOEA			SICK WITH ACUTE RESPIRATORY INFECTION				
	% OF TOT.	NUMB	% GR.III	% MOD. CARE	% OF TOT.	NUMBE	% GR.III	% MOD. CARE
GANDEVI (GUJ)	1.9	15	20	46.67	1.5	12	0	91.67
AKOLE (MAH)	8.6	121	11.6	64.46	13.2	185	11.4	64.86
GARAG (KAR)	4.7	65	13.8	69.23	4.8	67	9	79.10
KARCHHANA(U)	12.8	203	24.1	70.44	15.5	245	19.6	67.76
RAILA (RAJ)	4.9	56	25	39.29	5.1	58	27.6	27.59

% OF TOT. = PERCENTAGE OF TOTAL PRESCHOOL CHILDREN SICK

NUMBER = NUMBER OF PRESCHOOL CHILDREN SICK

% GR.III = PERCENTAGE OF SICK CHILDREN WITH GRADE III MALNUTRITION.

% MOD.CARE = PERCENTAGE OF SICK CHILDREN RECEIVING MODERN CARE

TABLE 7 : NUMBER OF CHILDREN WITH COMPLETED PRIMARY IMMUNIZATION IN 1-2 YEAR AGE-GROUP

	Gandevi (Guj)		Akole (Mah)		Garag (Kar)		Karchh (U.P.)		Raila (Raj)	
	% com.I	N	% com.	N	% com.	N	% com.	N	% com.Im	N
GIRLS	92.2	77	51.6	153	56.0	125	32.1	165	11.9	118
BOYS	89.0	73	51.4	173	64.0	178	43.4	173	9.0	144
TOTAL	90.7	150	51.5	326	69.3	303	37.9	338	10.3	262

Household characteristics and child nutrition :

Several background factors present in the house-hold and the family can influence child care situation, food availability and child feeding.

Family type :

Family type partially explains child care situation, availability of surrogate mothering care for young child. Thus in joint family, there is more likelihood of the child getting attention and feeding from another adult woman, in absence of its mother.

We found nutritional status be significantly better in joint families in Gandevi (Guj) (6.16% Gr.III) and Karchhana (U.P.) (12.3% Gr.III) only. In Garag (Kar) only the joint families where a woman was head of the household showed better child nutrition (Gr.III 5.68%). The difference was not statistically significant.

In contrast to this, in Akole (Mah), Garag (Kar) and Raila (Raj) pre-schoolers from joint families had slightly higher (not significant) proportion of Grade III malnutrition.

Size of the House-hold :

Large household size, on the other hand would mean either too many members sharing food basket or a larger food basket due to more hands working along with more child care availability. The difference based on the size of the house-hold was not significant in Gandevi (Guj), Akole (Mah) and Garag (Kar) where prevalence of severe malnutrition in preschoolers was found to be much lower than Karchhana (U.P.) and Raila (Raj).

In Karchhana (U.P.), larger house-holds (more than 5 members), especially those with more than 10 members, had significantly lower proportion of severe malnutrition (Gr.III 12.9%). So also in Raila (Raj) only very large households (> 10 members) had significantly better nutrition (Gr.III 13.6%).

Table 8 shows proportion of severely malnourished preschoolers in joint families and in the household having either 'less than 5' or 'more than 10' members.

TABLE 8 : PREVALENCE OF SEVERE MALNUTRITION BY FAMILY CHARACTERISTICS

STUDY AREA	FAMILY CHARACTERISTIC & % GRADE III W\A					% GR.III
IN STATE	NUCLEAR	JOINT	SMALL*	LARGE#	V.LARGE\$	IN TOTAL
GANDEVI (GUJ)	10.7	6.16	8.9	5.7	0	8.1
AKOLE (MAH)	7.05	8.55	7.5	8.2	7.2	7.8
GARAG (KAR)	8.66	10.3	10.1	9.7	10.3	10
KARCHHANA (UP)	21.4	12.3	20.4	16.19	12.9	17.4
RAILA (RAJ)	19.9	21.1	20.3	21.9	13.6	20.5
* Less than or equal to five members						
# Between five to ten members						
\$ More than ten members						

Number of Preschoolers in a house-hold :

Number of preschool children in the household may compete for food and care. This aspect was examined. Contrary to our expectations, household with larger number of preschoolers had better child nutrition. The difference was statistically significant in Akole (Mah) and Raila (Raj) where households having more than 2 or 3 preschoolers respectively had better nutrition (Gr.III 4.9% and 15.8% respectively).

Joint families with more underfives and also more adults providing for them would be expected to differ from nuclear families with larger number of underfives and only parents providing. Thus influence of number of underfive children in nuclear families was separately examined. However, total number of preschool children in the families do not seem to influence, child nutrition.

Drinking Water Source :

Children from families who had reported to have safe drinking water source (either from a hand-pump on a bore well or piped water supply) had better nutritional status in Garag (Kar) and Karchhana (U.P.). In Gandevi (Guj), Akole (Mah) and Raila (Raj), no difference was observed, based on source of drinking water used by the family.

Poverty :

Poverty in a family can at best be expressed as a relative state. There have been several attempts to define poverty, in terms of income and ability of the family to meet its calorie requirements. Poorest of the poor in rural areas rely on informal borrowing, seasonal migration and partial starvation for survival through the lean periods. The influences of these were examined.

Food Shortage and Migration :

Effect of food shortage and migration as reported by the family was examined. (Table 9). Overall food-short and migrating (at least one member) families had poorer nutritional status in preschoolers. Difference was significant for food-short families in Gandevi (Guj) and Karchhana (U.P.), and for migrating families in Karchhana (U.P.) and Garag (Kar). In Raila (Raj), comparatively larger number of households reported migration, but this had no influence on child nutrition.

Consumption loans :

Similarly households availing of loan for consumption purposes had higher levels of severe malnutrition; significantly so in Karchhana (U.P.) and Garag (Kar). In Raila (Raj) and Akole (Mah) this had no influence, where as in Gandevi (Guj) very few households reported having availed of consumption loan. (Table 9).

TABLE 9 : ASSOCIATION OF SEVERE MALNUTRITION IN PRESCHOOL CHILDREN							
	WITH POVERTY PARAMETERS OF FAMILY						
STUDY AREA	FAMILIES REPORTING						TOTAL
	FOOD SHORTAGE		MIGRATION		CONSUMPTION LOANS		CHILDREN
	N	% GR.III	N	% GR.III	N	% GR.III	
GANDEVI (GUJ)	220	12.7	62	8.1	51	2	783
AKOLE (MAH)	1079	8.7	496	8.9	130	6.9	1402
GARAG (KAR)	268	9.7	168	11.9	94	20.2	1396
KARCHHANA (UP)	386	22.8	235	20	72	20.8	1584
RAILA (RAJ)	225	22.2	335	20.6	377	21.5	1146

Characteristics of the member of the household :

Family members residing in a house-hold, have various individual backgrounds. Individually as well as together as a social unit, they influence and participate in the family's health behaviours. These characteristics were examined for their effects on preschoolers' nutrition.

Occupation :

Occupation of a person is very strongly linked to his/her education and income. Hence it is very difficult to separate the influence of occupational status from these two. However, some occupations due to their very nature, bring the rural family in contact with the outside world and knowledge-base, otherwise foreign to the rural families. Service in a nearby town or business are examples of such a situation.

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Households may pursue one or more different occupations, as sources of income. Thus preschoolers from families were grouped as :-

1. Families engaged in either agriculture, horticulture or dairy as the only occupation.
2. Families engaged in labour only (agricultural or other).
3. Families engaged in either service or business only.

Preschoolers from these families were compared with each other. Proportion of children suffering from severe malnutrition varied in these groups with Service + Business group faring better generally (Table 10). Preschoolers from Labourer families had poorest nutrition. The difference between Service + Business group and Labourers was significant in Gandevi (Guj) and Karchhana (U.P.). In Akole (Mah) and Raila (Raj), very few children belonged to family earning only from Service or Business.

TABLE 10 : PREVALENCE OF MALNUTRITION IN PRESCHOOL CHILDREN VARIATION BY FAMILY OCCUPATION.						
STUDY AREA	ONLY LABOUR		AGRI.\HORT. \DAIRY		SERV.\ BUSINESS	
	N	% GR.III	N	% GR.III	N	% GR.III
GANDEVI (GUJ)	334	11.1	76	5.3	141	5
AKOLE (MAH)	202	13.9	134	4.5	152	3.95
GARAG (KAR)	334	12	595	9.6	57	7
KARCHHANA (UP)	280	24.3	238	16.8	218	14.2
RAILA (RAJ)	56	16.1	177	20.3	16	18.8

In Akole (Mah) and Karchhana (U.P.) children from Agriculture + Horticulture + Dairy group were significantly better than children from Labourer group. The differences between Service + Business and Agriculture + Horticulture + Dairy groups were not significant.

Education :

Formal education exposes a person to newer ideas and progressive concepts. Thus it is expected that educated person is less likely to accept traditions and customs without examining their effects. However, intra-household status and decision making is not solely related to a person's education. Thus in different situations, educational levels of different persons in a family will have varying effect on the ultimate health behaviour in that family.

Five separate education related variables in a family were taken for analysis. These were - highest educational level, highest educational level in females, highest education in male above 18 years, highest education in female above 18 years and average educational level in the family. All the educational variables in the family were highly co-related.

Highest education in men and women (above 18 years) in the family were separately considered for examining their influence on preschoolers' nutrition. (Table 11).

TABLE 11 : SEVERE MALNUTRITION IN PRESCHOOL CHILDREN AND EDUCATIONAL LEVELS IN ADULT FAMILY MEMBERS					
	GANDEVI	AKOLE	GARAG	KARCHHANA	RAILA
STUDY AREA	(GUJ)	(MAH)	(KAR)	(U.P.)	(RAJ)
EDUC.ADULT MALE					
<P No.of U5	300	544	670	617	799
% GR.III IN <P	13.3	10.3	11	24.1	22.5
>=P No.of U5	483	858	726	967	347
% GR.III >=P	5.2	6.4	9	12.9	15.9
SIG.OF DIFF.	**	**	ns	**	#
EDUC.ADULT FEM.					
<P No.of U5	332	840	1092	1338	1103
% GR.III IN <P	10.5	9	10.3	19	20.8
>=P No.of U5	451	562	304	246	43
% GR.III >=P	6.7	6.2	8.6	8.1	13.9
SIG.OF DIFF.	**	**	ns	**	ns
Note :	** < .01, # approaching significance, not significant				

Education of adult men in the household :

Education beyond primary level made significant contribution to improvement in nutritional status of preschoolers in Gandevi (Guj) and Karchhana (U.P.) only. But, level of education above secondary level almost always had positive influence except in Garag (Kar).

Education of adult women in the household :

In all the areas proportion of preschoolers with severe malnutrition seemed to be lower in households having at least primary complete educated women. In Raila (Raj) this constituted a very small number (43 total) and hence their influence could not be examined.

In Karchhana (U.P.) preschoolers' nutritional status improved significantly at the primary completed educational level (Gr.III 6.8%), however, for households with secondary and above educated women, this did not improve (Gr.III 11.59%). This proportion though, is significantly lower when considering prevalence of severe malnutrition in the entire preschooler population in Karchhana (U.P.).

In Gandevi (Guj), the difference was significant only when the woman was educated above secondary level, whereas Gr.III 3.11% against 10.2% in Primary educated and 10.5% in less than primary educated, in Garag (Kar) the differences were not statistically significant. Table 11 shows the influence of educational levels of family members, on the nutritional status of preschoolers.

Parent Related Factors :

House-hold characteristics for nuclear families were examined separately to understand relationship of parental characteristics on child nutrition, independent of influences from other adult members (as in case of a joint family).

Children borne by the mother :

Total number of children borne by the mother in a nuclear family, did not seem to influence preschoolers' nutrition in general. In Akole (Mah) and Garag (Kar) lower proportion of severely malnourished preschoolers were observed when less than three children were borne by the mother (3.89% in Akole, 4.1% in Garag) as compared to more children borne (8.54%, 10.13%). The difference was statistically significant only in Garag (Kar).

Child Death :

Child death in the past in a family may indicate a high risk background for a preschooler. Any or combinations of the factors like lower awareness levels, lack of means for child care, may be present in the house-hold.

Of the children born to the same mother, the number which subsequently died, seemed to influence nutrition a little. In Gandevi (Guj) and Akole (Mah) numbers of preschoolers from nuclear families in which child deaths were reported, was low.

In Garag (Kar) poorer nutrition of preschoolers (12.15% Gr.III) was observed in nuclear families with woman reporting children deaths in the past. In Karchhana (U.P.) more than one child death reported, meant very high Gr.III (38.6%). In Raila (Raj) weak relation was seen between more than 2 child deaths and poorer nutrition in preschool children; this number was small, however. None of these differences were statistically significant.

Family Planning acceptance by the Parents :

Acceptance of family planning may indicate progressive attitude or awareness in parents. This was not so, however in preschoolers studied by us. Though not statistically significant, slightly high proportions of severely malnourished children were found in nuclear families which had reported acceptance of family planning in Gandevi (Guj), Akole (Mah), Garag (Kar) and Raila (Raj). Only in Karchhana (U.P.) children of family planning acceptors had lower proportion of Gr.III malnutrition (16.4%) than non-acceptors (22.5%). The difference was not statistically significant.

Differences in the social and economic groups :

Caste system is deep rooted in Indian villages with its influence on belief systems and behaviours of the people. Caste also is intricately linked to livelihood, asset ownership and wealth. It is thus worth while to examine its influences. Even if the caste can not be changed, the behavioural patterns and beliefs in the groups can be favourably modified for improving child rearing and nutrition.

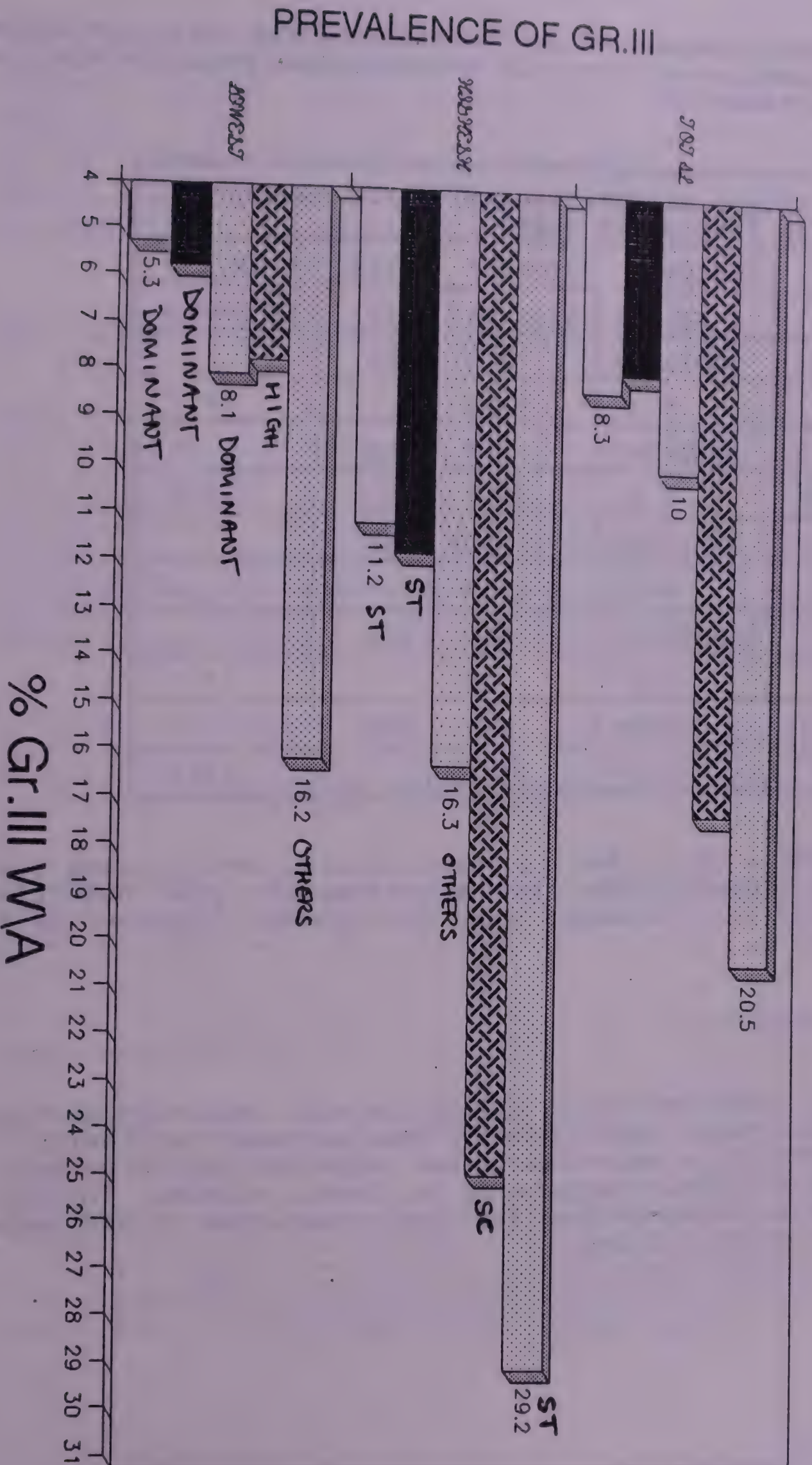
What contribution does the Religion and Caste have ?

In the areas studied, the population was almost entirely Hindu. In Karchhana (U.P) there were 224 Muslim households, which could be analyzed as a separate group. In other areas Muslims, and Jains in Karnatak are included in the 'Other' group for analysis purposes.

Dominant & higher caste preschoolers generally fared better in the study areas. This group had significantly better nutrition compared to the rest of the preschooler population. In Raila (Raj), however, Dominant + Higher caste group was not better; in fact children from Dominant caste (Gujar and Rajput) were found to be significantly malnourished (Gr.III 24.3%). But when analyzed separately, Rajput children fared significantly better (Gr.III 15%). Other Hindu group in Raila (Raj) comprising of Sadhu, Pujari, Nath, Vaishnav etc. was significantly better (Gr.III 16.2%) than rest of the preschoolers.

Scheduled Caste (SC) and Scheduled Tribe (ST) children demonstrated poorer nutritional status. The difference between Dominant + High caste group and these groups was significant in all areas, except in Garag (Kar). In Garag (Kar) 'Other' group of Hindu children had the poorest nutritional status (16.3% Gr.III) which was significantly lower than that in Dominant + High caste preschoolers. In Karchhana (U.P.), SC children were significantly worse than even Other Backward Caste (OBC) children and in Raila (Raj) ST preschoolers were worse than SC, OBC and Others.

DIFFERENCES IN PREVALENCE OF GR. III in five study areas by Caste Group.



GUJ. MAH. KAR.
U.P. RAJ.

Caste Groups demonstrating the best and the worst nutrition (as proportions of severely malnourished preschoolers) is given in Table 12.

TABLE 12 : SEVERE MALNUTRITION BY CASTE GROUPS IN FIVE STUDY AREAS				
STUDY AREA	LOWEST	HIGHEST	DIFF.	% GR.III
IN	% GR.III	% GR.III	SIG.	IN TOTAL
GANDEVI	DOMINANT	S.T.	YES	
(GUJARAT)	5.3	11.2		8.3
AKOLE	DOMINANT	S.T.	YES	
(MAHARASHTRA)	5.8	11.8		7.9
GARAG	DOMINANT	OTHERS	YES	
(KARNATAK)	8.1	16.3		10
KARCHHANA	HIGHCASTE	S.C.	YES	
(U. P.)	7.8	25		17.3
RAILA	OTHERS	S.T.	YES	
(RAJASTHAN)	16.2	29.2		20.5

In Karchhana (U.P.) Muslim preschoolers, constituting 9.6% of total preschoolers, had significantly poor nutrition (Gr.III 13.2%), however, they were better compared to SC children.

Asset Ownership :

Property, Power and Prestige are the most important driving forces for human behaviours. Thus economic well-being of the household is expected to be reflected in the property or asset holding, to greater or lesser extent. In non-agrarian or landless families this is expected to influence domestic asset holding.

Comparison of preschoolers from households possessing assets of varying value showed that those from families "Having assets" fared consistently better than from families "Not having assets". Differences were statistically significant, however, only in Gandevi (Guj). Upward mobility of a family's economic position, as measured by acquisition of assets in past five years, made no significant contribution to this difference.

Agro-Economic (AE) & Socio-Economic (SE) status :

Each family was given a score for its Agro-Economic and Socio-Economic status based on the co-relation coefficients for each background variable in the factor analysis for each area. The AE status factor included land-holding, irrigated land, agricultural assets and their acquisition. The SE status factor included education, occupation, caste and domestic assets holding and acquisition. In Raila (Raj) educational levels in the population were very low and education and caste were independent factors.

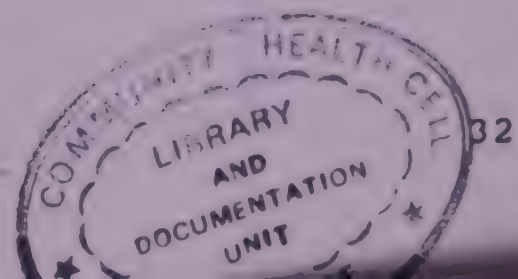
Children belonging to the highest quartile were significantly better than those in the lowest quartile of SE status in all study areas except Garag (Kar), where no significant difference was observed.

As far as AE status was concerned significant difference in nutrition of preschoolers from the highest and lowest quartile families was observed Akole (Mah) and Karchhana (U.P.).

Land ownership :

Households owning land often differ in several ways from those landless. Land owners have access to at least the minimum resource, and livelihood opportunity. Significant differences were observed between preschool children from landed and landless households. Children from landless households had significantly larger proportion of severely malnourished children, in three areas - Gandevi (Guj), Akole (Mah) and Karchhana (UP). (Table 13)

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LANDHOLDING AND SEVERE MALNUTRITION IN UNDERFIVES FROM FIVE AREAS

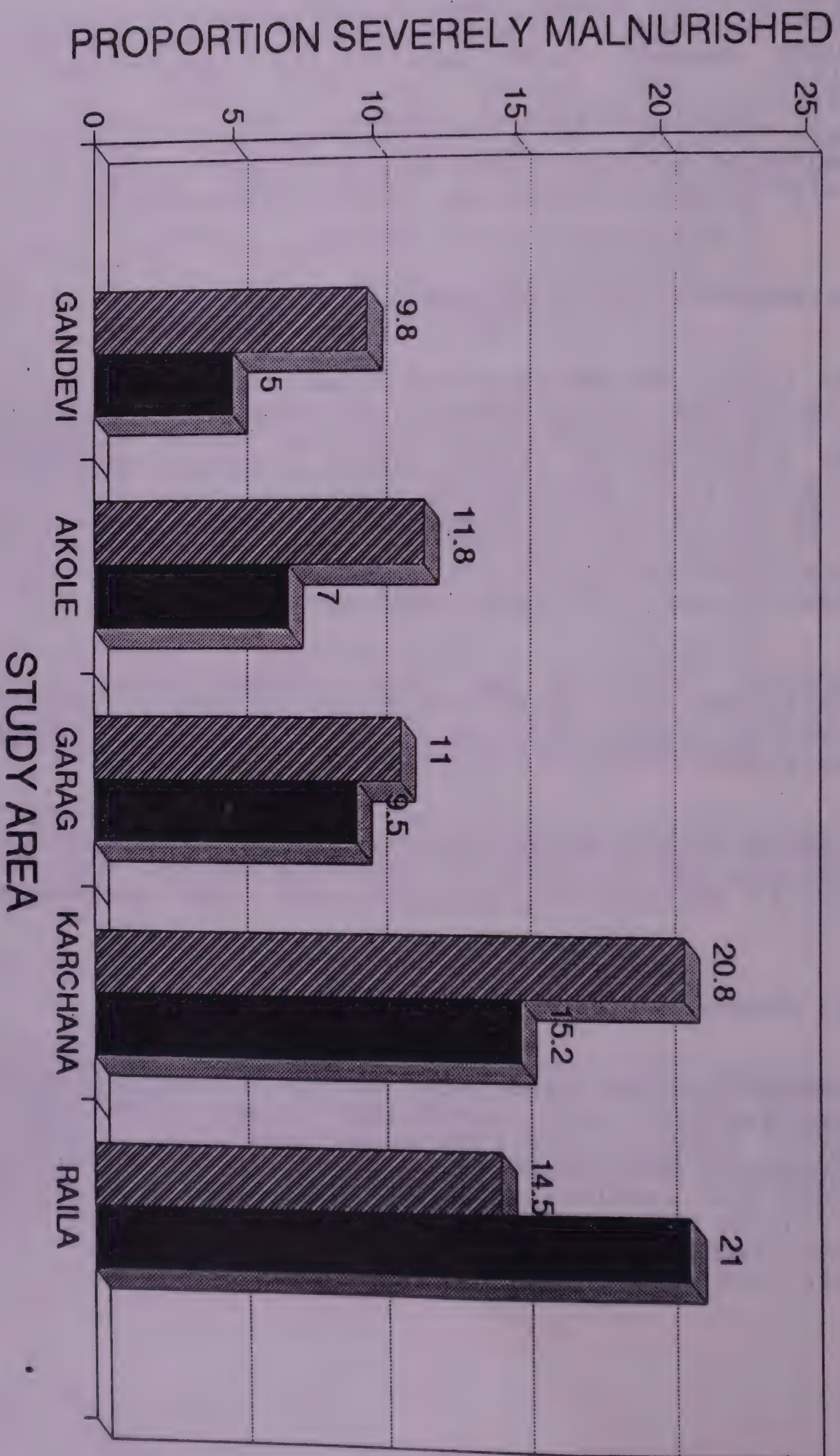


TABLE 13 : DIFFERENCES IN PROPORTION OF SEVERE MALNUTRITION IN LAND OWNERS' AND LANDLESS PRESCHOOLERS					
PROPORTION OF U5	GANDEVI	AKOLE	GARAG	KARCHANA	RAILA
<60% STD.WT/AGE	(GUJ)	(MAH)	(KAR)	(U.P.)	(RAJ)
TOTAL UNDERFIVES	783	1402	1396	1583	1146
% GR.III IN TOT.	8.3	7.9	10	17.3	20.5
TOTAL LANDLESS U5	543	272	435	602	83
% GR.III IN LANDLESS	9.8	11.8	11	20.8	14.5
TOT. U5 IN LANDED HH	240	1130	961	981	1063
% GR.III IN LANDED	5	7	9.5	15.2	21
SIGNIFICANCE LEVEL	*	**	NS	*	NS
	** : < .01				
	* : < .05				
	NS : Not Significant				

Relative contribution and inter-relations in the factors :

Several background factors were thus found to influence child nutrition in different areas. There were commonalities and difference, and it was necessary to examine relative influence of the factors controlling for the influence of the others.

The regression model described earlier was applied to each of the data set with 'weight-for-age' as the dependent variable. The same model was applied for three different age groups, infants, one to three year olds and above three year olds; to examine any age related variations in factors showing significant influence. Results are presented in the Table 14 and the details are given in the Annex 2.

TABLE 14 : FACTORS INFLUENCING CHILD NUTRITION IN FIVE AREAS					
	BASED ON COMMON REGRESSION MODEL				
REGRESSION MODEL	GANDEVI	AKOLE	GARAG	KARCHANA	RAILA
	(GUJ)	(MAH)	(KAR)	(U.P.)	(RAJ)
Age in mths	**	**	**	.	**
Male sex	.	.	.	.	.
Land holding	.	.	.	.	.
Adult fem. educ >P	.	.	**	**	.
Adult male educ >P	*	**	.	.	*
SC / ST	*	*	.	**	**
Safe drn. water	.	.	**	**	.
Family size	.	.	**	.	.
Joint family	.	.	.	*	.
Migration	.	.	.	.	.
Food distress	.	.	.	*	.
Note : Significance	** < .01, * < .05				

Malnutrition levels rose with age which had negative beta values at the significance level less than 1% , in all areas except Karchhانا, U.P. In Karchhانا, even the infants had high levels of malnutrition.

Education either in an adult male member or in a female member mattered in all areas. This however did not seem to be related to levels of education in women in the areas.

Belonging to a SC or ST household meant poorer weight-for-age in most areas, except Garag (Kar). Use of safe drinking water source was positively related to weight-for-age. Joint family type was showing positive influence in Karchhانا, U.P. Family size negatively affected child nutrition in Garag, Karnatak. Food distress negatively influenced child nutrition in Karchhانا, U.P.

It was found that despite the difference in the development levels, literacy and levels of malnutrition observed; very similar combination of factors was important in Gandevi (Guj), Akole (Mah) and Raila (Raj). In these three areas beside negative correlation with the age, negative influence of belonging to SC or ST family and positive influence of at least primary level education in the adult male in the household was observed.

In Garag, Karnatak where the community is conservative and tradition bound; and in Karchhana, U.P. where caste system has strong hold, we found education of women to be important. Where as in the other three areas it was education in the men which influenced child nutrition favourably. In the same two areas use of potable or safe drinking water source was significantly positively related to weight-for-age.

In age group wise analysis though no discernible pattern was found. More number of factors seemed to become important after infancy in most areas.

What could be the reasons for these differences ?

Qualitative data about child care and child feeding practices throws some light on the factors found to influence child nutrition and the differences observed between different study areas. Detailed area specific descriptions of child feeding practices are given in the Annex 3, and some findings related to major domains are presented here.

CHILD FEEDING PRACTICES

What is the child fed with ? :

A newborn baby is given honey or a few drops of castor oil with water on the first day of life to clear its bowels of the dark, sticky stools - the meconium. After this it is fed diluted animal milk, preferably cow's milk until its mother starts getting good flow of breast milk. After this breast milk is the main food for the baby. Water is fed only if the summer is too harsh.

If the breast milk is not sufficient, the child is fed with diluted animal milk, usually later in infancy and only if the parents can afford it. With a exception of a few, children are offered solid foods only about the age of 12 to 18 months.

Biscuits or bread softened in tea or milk; rice, other adult foods mashed or softened are also offered. Some deep fried snack foods available ready made in the village shops are quite popular with mothers and children alike. Fruit like Banana and Apples, and sweets made from milk are special treats for children.

Breast feeding :

Colostrum is usually expelled, even by the educated mothers; unless the delivery has taken place in a hospital and the doctor has insisted on feeding the child with colostrum.

Breast feeding is universal. It commences from the third day after delivery and is usually continued for long durations, well in to the second or third year of the child's life. When the mother gets pregnant again, however, breast feeding is stopped. It is believed that breast milk from the pregnant mother is 'bad' and will make the child sick.

PROFILES OF NORMAL AND SEVERELY MALNOURISHED CHILDREN

STUDY AREA I CHARACTERISTIC	GANDEVI NORMAL	(GUJ) GR.III	AKOLE NORMAL	(MAH) GR.III	GARAG NORMAL	(KAR) GR.III	KARCHANA NORMAL	(U.P) GR.III	RAILA NORMAL	(RAJ) GR.III
TOTAL CHILDREN	271	65	517	111	472	139	411	274	282	235
BOYS %	47.6	52.3	50.3	55	54.7	49.6	53.3	54.7	52.5	57
GIRLS %	52.4	47.7	49.7	45	45.3	50.4	46.7	45.3	47.5	43
HAVE DIARRHOEA %	1.1	4.6	9.5	12.6	5.5	6.5	8.3	17.9	4.3	6
HAVING ARI %	1.5	1.5	14.9	18.9	5.5	4.3	13.9	17.5	4.6	6.8
IN NUCLEAR FAMILY %	44.2	61.5	36.6	32.4	36.2	36	44.5	67.8	55.7	55
IN JOINT FAMILY %	55.7	38.5	63.4	69.6	63.8	64	55.4	32.1	44.3	45
DOM/HIGHER CASTE %	47.2	26.1	62.1	40.5	60.8	49.7	26.3	9.1	30.9	31.9
SC/ST FAMILY %	44.6	69.3	24.2	45.9	22.2	23.8	28.7	51.1	23.8	31.4
ADULT MALE <P EDUC %	30.7	61.5	29.6	50.4	46.8	53.2	31.4	54.4	65.2	76.6
ADULT MALE >S EDUC %	36.5	15.3	31.2	17.1	24.8	22.3	42.1	23	11.7	5.6
ADULT FEMALE <P EDUC %	35	53.8	51.3	68.5	76	81.3	76.4	92.7	95.1	97.5
ADULT FEMALE P EDUC %	27.3	35.4	41.4	28.8	17.6	12.9	17.3	4.4	4.3	1.7
ADULT FEMALE >S EDUC %	37.6	10.8	7.3	2.7	6.3	5.8	6.3	2.9	0.7	0.9
FOOD SHORTAGE %	24.4	43.1	72.7	84.7	18	18.7	20.9	32.1	18.1	21.8
MIGRATING %	7	7.7	33.1	39.6	11.9	14.4	10.7	17.2	21.4	29.4
LANDLESS %	64.6	81.5	14.7	28.8	33.1	34.5	34.5	45.6	7.1	5.1

FACTORS RELATED WITH A PRESCHOOLER'S WT-FOR-AGE IN FIVE STUDY AREAS, 1994.

DESCRIPTION OF THE VAR. IN REGRESSION EQUATION	GANDEVI (GUJ)		AKOLE (MAH)		GARAG (KAR)		KARCHHANA (U.P)		RAILA (RAJ)	
	BETA	Sig T	BETA	Sig T	BETA	Sig T	BETA	Sig T	BETA	Sig T
AGE OF CHILD IN MONTHS	-0.2360	0.0000	-0.1582	0.0000	-0.2277	0.0000	-0.0260	0.2924	-0.2277	0.0000
MALE SEX OF THE CHILD	-0.0633	0.0647	-0.0454	0.0833	-0.0288	0.2683	-0.0223	0.3639	-0.0288	0.3045
LAND HOLDING IN ACRES	0.0650	0.0766	0.0370	0.2305	0.0227	0.4664	0.0376	0.1706	0.0227	0.6185
ADULT FEMALE EDUC > = PRM.	-0.0333	0.4896	0.0373	0.2309	0.0880	0.0025	0.0779	0.0044	0.0880	0.8462
ADULT MALE EDUC > = PRIMARY	0.1168	0.0107	0.0879	0.0065	0.0080	0.7917	0.0383	0.1674	0.0080	0.0107
BELONGS TO SC/ST FAMILY	-0.0932	0.0193	-0.0780	0.0142	-0.0230	0.4192	-0.0965	0.0003	-0.0230	0.0054
SAFE DRNK. WATER SRC. USE	0.0044	0.9001	-0.0191	0.4783	0.0751	0.0047	0.0906	0.0003	0.0751	0.3733
FAMILY SIZE : NO. MEMBERS	-0.0334	0.4288	-0.0262	0.3958	-0.0969	0.0042	0.0358	0.2318	-0.0969	0.9672
BELONGS TO JOINT FAMILY	0.0372	0.3756	-0.0386	0.1946	0.0176	0.5629	0.0598	0.0488	0.0176	0.7168
MIGRATION REPORTED	-0.0207	0.5537	0.0214	0.4401	0.0182	0.5358	-0.0424	0.1076	0.0182	0.7773
FOOD DISTRESS REPORTED	-0.0533	0.1677	-0.0186	0.5172	-0.0366	0.1887	0.0649	0.0245	-0.0367	0.5131
NUMBER OF PRESCHOOLERS	783		1402		1396		1583		1146	
MULTIPLE R	0.3269		0.2329		0.2703		0.2455		0.2703	
R SQ.	0.1069		0.0542		0.0731		0.0588		0.0731	
ADJUSTED R SQ.	0.0941		0.0467		0.0657		0.0522		0.0657	
DF = 11 F =	8.3871		7.2454		9.9174		8.9242		9.9174	
RESIDUAL	771		1390		1384		1571		1134	
SIGNIFICANCE OF F	0.0000		0.0000		0.0000		0.0000		0.0000	

CHILD FEEDING AND CHILD CARE MAKE A DIFFERENCE !
SOCIO-ECONOMIC STATUS INFLUENCING CHILD HEALTH

GUJARAT

In Gandevi area where this data was collected, PHC has good extension and image in the minds of the people. Thus access to PHC both physically, emotionally and economically is possible. Parents especially mothers have high awareness level. They are educated and well informed too. Major occupations in the area is agriculture, growing orchards (wadi), cattle breeding where men are engaged intensively and women get time to look after children. The practice of prolonged breast feeding is common. In the cases where mother is sick, pregnant or unable to produce sufficient milk, breast feeding is discontinued, comparatively early.

Usually child is given liquid items in seventh or eighth month of age, they include vegetable juices, fruit juices, cow \ goat milk etc. After a year they are given chapattis and non-spicy vegetables along with dal and rice. Being well developed infrastructure almost every child is fully immunised. Curative health care is sought relatively early in the course of illness, that too from modern medicine practitioners, even specialists.

In this milieu, certain differences are observed across socio-economic strata. For the purpose of the study entire study population has been divided into four socio-economic categories, namely higher, upper middle, lower middle and lower class.

Higher class is typically exhibits some of the following characteristics : wadi ownership, irrigated land, number of milch animals, big constructed houses and possession of house-hold gadgets and luxury items. Many have family members who are migrants to foreign countries or to cities working in highly paid professions.

Middle class is divided into two. Upper-middle class families have land and \ or permanent jobs as against the lower-middle class families. The lower-middle class persons work as farm labourers although some own land too. A smaller number of cattle head is owned (compared to the higher class), and irrigated land is limited, almost non-existent in the lower-middle classes. In the UM atleast a few members have education up to high-school, even in girls; where as in LM families education is comparatively lower, which probably reflects in lower fraction of persons from these families employed (in services).

Migration is prevalent among lower class because they are not employed for the whole year in their villages. Lower class is characterized by small hut, no asset holding, very poor level of family education etc. Relatively more families face food availability crisis in this class, especially in summer and early monsoons.

Child care and child feeding differs among these classes, mainly due to these socio-economic differences. Economic compulsions on the mother from lower classes means that she can spare little time for child care and feeding. Upper classes show a bias towards private medical care since they can afford the services of specialists.

Among higher and upper middle mother is at home to look after the child, they usually have joint family where at a time many members are available to take care of the child. It is observed that mother being well educated and aware of ante-natal care, at birth baby's weight is normal which is not the case with the lower and lower middle class families.

Timely weaning coupled with prolonged breast feeding is one of the major contributing factors to better nutritional status of a child in higher and upper-middle classes. At an individual child's level, when siblings were compared, appetite of a child seems to be the deciding factor in his or her nutritional status.

Among lower middle and lower class less spacing between two children, lower maternal age (less than twenty) during the first pregnancy, child caretaker being other than mother and major or repeated illness episodes coupled with late weaning are contributing negatively towards the nutritional status of the child. These factors are more prominent here as against the factors like duration of breast feeding or child's appetite.

MAHARASHTRA

The study was carried out in the Akole district of state Maharashtra. The villages are well connected to Akole by roads. The settlement pattern is scattered, people stay in hamlets in hilly area which are not easily accessible. Main occupation is agriculture while dairy is subsidiary occupation. Landless families are engaged in agricultural labour, construction labour. There is a Government Rural Hospital at Akole, private practitioners and specialists at Akole and Sangamner.

ANM visits villages monthly. Nutritional food supplements are provided to the underfives through Integrated Child Development Scheme. Pregnant ladies consume regular diet Bajara roti and vegetables or dal, and nothing special. Those from poor families suffer from starvation. Iron tablets and T.T injections are given by ANM free of charge. However, very few accept these. Women say that when iron tablets are consumed during pregnancy it leads to nausea, the foetus grows extra-heavy and they believe that it leads to problems during delivery. People feel that injections and tablets need to be consumed only during illness and not otherwise. Agricultural work and accessibility problems also deter women from seeking health care.

Some women from higher classes do go in for antenatal check-ups in private hospitals and take iron tablets regularly. Home delivery is a common practice, but premises prefer hospital delivery so also those with complications or prolonged labour.

Colostrum is considered to be stored milk which needs to be expelled to initiate the milk flow. If newborn is given colostrum he/she may suffer from vomiting and diarrhoea as it is heavy to digest. In hospitals, on doctor's advice though, colostrum is given to the neonate.

Top feeding (milk) is started when baby cries even after breast feeding. Usually it is started sixth months onwards only when it is available at home. Milk is diluted in 1:1 or 1:2 proportion. Semisolid foods, Rice and dal is introduced in the ninth month if family can afford to. Biscuits are also given to the baby whenever available. Vitamin supplements are also given to the baby's as per doctor's advice if possible economically.

Awareness regarding immunization is increasing. Immunization coverage is on raise. Frequent illness episodes like diarrhoea and ARI also affect child health. Timely health care is sought by some families. The trend is towards acceptance of modern medicine. Private practitioners and Akole Rural Hospital both are popular in the area. At times it is believed that fever is on account of "Nazar" i.e evil eye .Magico religious treatment is sought, Bhagat gives "holy" ash .

These are the general beliefs and practices affecting the health and the nutritional status of the child. Socio-economic status of the family is found to be one of the important factors affecting the child care and child feeding practices. This in turn determines the nutritional and health status of the child. All the four socio economic strata show certain similarities and differences .

Higher class families have large irrigated land holdings, grow cash crops, possess a number of milch animals, have dairy as a side-business, and proportion of members with higher education in family is more.

Upper middle class possesses less acre of irrigated land as compared to upper class, grow a single cash crop per year, number of milch animals is lesser and percentage of higher education is good.

In Lower middle class land is mostly rainfed, production just sufficient for the family, a few milking animals, and lower prevalence of higher education.

Lower class is of landless labourers or some with marginal landholding, production is not sufficient for subsistence, families face starvation during pre-monsoon season, working in areas outside the village is common (circular movement), and illiteracy is high.

Child care and child feeding practices show differences across socio-economic strata. When it comes to health seeking high class and upper middle class prefer private practitioners for personal attention and quality care. Government services being free of charge are not valued. Lower middle class depending on the perceived severity of illness choose Government or private practitioners.

Poor class mostly relies on Government health care facilities as they are free of cost and effective too. Timely health care seeking is exhibited by upper and upper middle class on account of awareness and economic status. Economic constraints is a major hindering factor for timely health care in lower middle and especially for lower class, along with lesser awareness levels.

Among Upper and upper middle class with joint families there is some elder member to look after the child at home. Mother can afford to stay at home and look after the baby for a longer time. It is not so with lower middle class and especially lower class. Higher class and upper middle families, women can afford to take antenatal care, and at times seek treatment from specialists. Lower class women seek care from ANM in the villages but due to economic compulsions at times they can't stay in the village when ANM comes. Lower class also suffers from starvation aggravating the situation.

Even when prolonged breast feeding is a common practice in the area, higher and upper middle class start top milk when baby cry even after breast feeding sixth month onwards. Lower middle class starts top milk if it is available at home. Lower class can't afford to give top milk. Higher and upper middle class introduce rice and dal ninth month onwards. Lower middle class may introduce semisolid food if available at home. Poor class eats rice only on festive occasions hence weaning is delayed. Biscuits are given by all classes but frequency is entirely dependent on the economic condition of the family.

Antenatal care, timely health care in illness, more time given by the mother to the baby, frequency of feeding, prolonged breast feeding, semisolid food supplements, vitamin supplements are some of the factors positively contributing to the better nutritional status of the children in upper and upper middle class.

Poor nutritional status of the mother, poor antenatal care, surrogate mother looking after the baby affecting feeding of the baby, late weaning and illness episodes like ARI and diarrhoea are the factors contributing negatively towards nutritional status of the children among lower, especially lower class.

KARNATAK

Dharwad district of Karnatak is mainly agrarian, traditional society despite developing industry in the nearby townships. The villages surveyed are well connected to Dharwad town by road and transport facility. Tertiary care facility for this area is about fifteen kilometres away.

Joint family system is very strong in this area. Families having more than twenty members is not unusual. In village Lokur resides a family featuring in Guinness Book of World Records with over hundred members.

Home deliveries, prolonged breastfeeding, late weaning are common. In some of the villages, due to previous episodes of injection precipitated (due to DPT) Polio-myelitis, there is severe resistance to immunization. For certain problems like severe wasting and green diarrhoea - 'Muttu Dosha' - are treated with magico-religious methods, while modern medicine is resorted to for common ailments like fever, cough, diarrhoea.

High socio-economic status of a family is reflected in larger landholding, cash crops, number of milch animals and large Pucca houses. Literacy is comparatively better in this class. Upper middle class families have similar characteristics, but smaller landholding and lesser assets.

Lower middle class has rainfed land, small houses. Whereas Lower class exhibits very poor housing conditions, illiteracy and more nuclear families. Landless labourers fall in this category. Starvation is a common feature and awareness levels are low.

Higher and Upper Middle class families can afford to feed the children with milk, Pedha (milk product) and other semisolid snacks, products made from rice and semolina (course wheat flour), biscuits, Banana etc. Supplementary feeding is started by six to seven months' age. Milk is usually diluted. If prescribed by doctor, commercial milk formulae or weaning foods are also given. Private practitioners are preferred and consulted early in the illness.

Lower middle class families rarely give the above mentioned delicacies, but do feed the children with rice, milk and Banana. What differs is the frequency with which the child is offered these food in a week. Milk is offered only if produced by the family. Health care is prompt.

Lower class family can not as a rule afford milk, and feeds the children black-tea, which is habit forming. Biscuits and Bananas are delicacies for these children. Rice and sugar are given only to a child having good appetite.

What differs across the SE strata is variety of child foods available with the family \ affordable. Frequency of purchasing special foods for the children, timely health care and access to health care in terms of time and money. Father's educational status and awareness are the main factors contributing to better child care, mainly due to relatively low mobility of women from these villages.

Joint families although offer better care-taker to the child, lead to restrictions on varieties of foods offered to the child; mainly because of presence of large number of other children in the family.

RAJASTHAN

Data was collected from thirty-eight villages around a small township, Raila. Raila has a block Primary health centre and Ayurvedic (Indian major traditional) medicine centre. People from surrounding villages come to Raila for treatment. For minor illness private practitioners - "Mansoori clinic" - are preferred whereas for major health problems PHC doctors are consulted because that works out much cheaper. Although PHC staff claim eighty percent coverage, in reality it is much less. People still have considerable knowledge of herbal medicines and practice it in day to day life.

The major occupations in the area are agriculture, labour in agriculture and cotton mills, animal husbandry [cows, sheep, camel]. Many people migrate to other areas for three to four months with well digging contractors. Formal education is not rooted deeply in the area especially among women. Men who are educated [mostly from upper caste and class families] seek service in and around the township.

Communication links of the study area are poor even to Raila considering both transport and tele-communication facilities. This leads to less exposure to other developed areas, reflected into low awareness level of women regarding child health.

Practice of prolonged breast feeding is common, as is late weaning. Colostrum is expressed and discarded and infant is given oil mixed with jaggery for initial three days. It is believed that mother's milk is sufficient for a child for a year and half. Moong dal and mashed chapatti is common weaning food.

Although child feeding and rearing practices are common in the area, there are few differences found across four socio-economic groups. These four socio-economic groups appeared to form a continuous spectrum and do not exhibit exclusive characteristics as a rule, with the exception of a few.

Higher class families have irrigated land, atleast one of the family members has permanent job, they hold property in common, along with cattle ownership. Some higher class families are technically nuclear but functionally joint, hearth is separate but income sources are common. This gives them an added advantage of positive factors like facility of child care.

Upper and lower middle class families do not demonstrate sharply demarcating differences between them. They have various common characteristics, piece of irrigated land or service, silver ornaments, cattle ownership and mostly nuclear families with different income sources.

Lower class families show following characteristics : Nuclear families, small piece of land, usually not irrigated or are mostly landless, starvation, migration, lack of education. Almost everyone in the family works for the whole day. The external appearance of their houses gives the idea of prevailing poverty.

These classes have different levels of awareness and typical socio-economic constraints which determine the nutritional status of a child. Among higher class families mother is at home to look after the child. They are aware of the ante-natal care, immunisation of children, proper weaning age, sometimes use of spacing methods. This contributes to normal growth of a child. In some cases mother's poor health, major morbidity of child and low birth weight leads to poorer nutritional status of a child.

In upper middle and lower middle class families education level of mother is less compared to higher class women. This is reflected into their ignorance towards ante-natal care, immunisation of child, proper weaning age and other preventive actions. Therefore although mother is available to the child, the nutritional status of a child gets affected in negative direction.

Among lower class families parents are out in the field, they either carry their children with them or elder siblings take care [?] of them. Due to constant economic crisis family can not afford to provide sufficient food to feed all members. It is always father and mother who starve atleast for a few days in a month. Such a situation ultimately results into the deterioration of family's and especially child's nutritional status. This is further aggravated by major and repetitive health problems of the child. Low awareness level determines the health seeking behaviour _ late approach to health centre and excessive reliance on home/ magico-religious remedies.

Irrespective of all socio-economic and environmental factors affecting child's nutritional status , it is the duration of breast feeding coupled with age at weaning, appetite of a child and his\her susceptibility to illness which play major role in determining nutritional status of a child.

UTTAR PRADESH

In Karchana (Dist.Allahabad), where this data was collected Community Health Center has well developed network of services spreading over 93 villages. Even though physical access to Primary Health Care is high in this area, the actual extension is not so good. The Auxiliary Nurse Midwives (ANM), usually belonging to higher caste, rarely visits lower caste hamlets. Thus doorstep MCH services are used by only a small, privileged fraction of the society.

For treatment of health problems, private " Zhola Chhap Doctors" are preferred by all across the socioeconomic classes. These "Zhola Chhaps" are in-fact untrained or at best poorly trained paramedical persons who are practicing medicine illegally. They are popular due to their availability and practice of administering injections.

Major occupations in the area are agriculture, animal husbandry, agricultural labor, artisan. Some are engaged in service. Based on the family characteristics, the entire study population was divided into four socioeconomic classes, namely Higher, Upper Middle, Lower Middle and Lower class.

The Higher class is characterized by ownership of large plots of irrigated land, modernized farm assets and luxury domestic assets such as Television sets and two wheelers. Most of the families are joint families, engaged in agriculture, horticulture and service as main occupations. Women from this class have fairly higher levels of education as compared to other classes.

Middle class is divided into two. Upper middle class with big and marginal farmers with some having irrigation facilities. Service and business are mentioned as subsidiary occupations. Asset holding pattern and male literacy levels are in proximity with higher class. Lower Middle group comprises of small landholders, artisans and laborers. Plough, steel utensils and bicycles are the common assets owned by the families.

Lower class is characterized by mostly nuclear families residing in small huts, working as laborers in the village or at the town places. Asset ownership is limited to a few steel utensils.

These socioeconomic deferences also get reflected in Child care and Child Nutrition .

Restrictions on mobility and observance of practices like "Purdah" are strong, especially among Upper class women in the area. Women from the Upper Class get ample time to look after their children. As joint families is a common feature in this class children are looked after by a number of care takers.

Better nutritional status of underfives in this class can be attributed to timely introduction of supplementary solid foods, along with prolonged breast feeding observed very carefully. Weaning process is initiated by a religious ceremony called as " Pasani " . Rice porridge (Kheer) is prepared on this occasion and fed to the baby. From this day onwards supplementary foods such as rice, lentil and vegetable soups are introduced gradually in the child's diet.

In the lower middle and lower class breast feeding is continued up to next pregnancy or till the child is 3-4 years old. It was observed that several lower middle and lower class women reported decrease in the quantity or no breast milk after 4 to 6 months or so. In such conditions, if the family does not own milch animals, powdered milk is fed to baby till 1 to 1.5 months with 50 % dilution. It works out cheaper than cow's or buffalo's milk.

No solid are fed to the child as long as either breast milk or powdered milk feeding is done. Supplementation may start after one and a half months, when milk is withdrawn. The belief is that if the baby is consuming milk it does not require solid food. Thus late weaning and insufficient breast feeding in case of anemic mothers leads to malnutrition.

The village and household level observation data shows differences in the hygienic practices across caste and economic classes. Sanitation in the Upper classes is better than the Lower classes. The drinking water well in the lower class hamlet is also used for washing, and the waste water was seen to stagnate and seep back into the well. It also get reflected in the number of illness episodes the child from Lower class family suffers from. Private practitioners are preferred, but are expensive, hence treatment is deferred till late in the illness.

The mothers from the Lower class families usually have to go out for work, leaving the child in care of elder sibling. No special foods are prepared for the toddlers either. Combination of these factors is seen to reflect in a number of poorly nourished children observed in such hamlets.

ANNEX 4 : RESULTS OF THE NFHS SURVEY, INDIA 1992-93.

	GUJARAT		MAHARASHTRA		KARNATAK		UTTAR PRADES		RAJASTHAN	
	Total *	Severe**	Total	Severe	Total	Severe	Total	Severe	Total	Severe
	%	%	%	%	%	%	%	%	%	%
UNDERWEIGHT (WAZ)										
ALL	44.1	14.9	52.6	20.2	54	19	49.8	19.2	41.6	19.2
RURAL	45.8	16.5	57.5	24.1	57.3	20.8	50.5	19.8	41.1	19
STUNTED (HAZ)										
ALL	43.6	21.6	46	21.9	48	23	49.2	27.6	43.1	26.6
RURAL	44.6	21.8	50.8	26.2	50.6	24.4	50	28.2	43	26
WASTED (WHZ)										
ALL	18.9	3.5	20.2	4.1	17.4	2.6	16.2	2.6	19.5	5.2
RURAL	20.3	3.4	21.5	4.3	17.8	2.8	16.4	2.7	17.7	5
MAXIMUM	AGEGRP.	%	AGEGRP	%	AGEGRP	%	AGEGR	%	AGEGRP	%
UNDERNUTRITION	12-23	19.9	24-35	27.1	24-35	27.9	24-35	23.7	24-35	25.7
	24-35	18.8					36-47	23.5	12-23	25
STUNTING	36-47	30.9	36-47	33.7	36-47	37.5	36-47	42.9	36-47	31.7
WASTING	12-23	6.7	12-23	7.6	12-23	6	12-23	5.2	12-23	7.2
GENDER DIFFERENCES										
GIRLS	at par or better		at par or poorer		poorer nutrition		at par / no diff.		at par / worse	
BOYS	more stunting		more wasting		wasting commoner		more wasting		more stunted	
OTHER FACTORS										
BREAST FEEDING	Universal		Universal		Universal		Universal		Universal	
WEANING AT 6 MTH	<10 %		<15 %						5 %	
WEANING AT 12 MTH	60-70%		60 %						20 %	
Mainnutrition with -										
BIRTH INTERVAL	< 24 mth		< 24 mth		<24 mth		modest diff.		<24 mth	
BIRTH ORDER	4-5		4-5				4-5		4-5	
MOTHER'S EDUC.	< middle school		< high school		< middle school		< high school		< high school	
CASTE	SC / ST		SC / ST/Budhlet		ST 26% wasted		SC and Muslime		SC / ST	
REMARKS					Muslim better		Boys breast fed beyond 2 yrs.		Wasting high in 6-11 mth (6.5 %)	
									Rural not worse	
									No Caste diff.	
									few women educat	

* TOTAL = LESS THAN - 2 SD

** SEVERE = LESS THAN - 3 SD

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BAIF's mission is to create opportunities of gainful self-employment for the rural families, especially disadvantaged sections, ensuring sustainable livelihood, enriched environment, improved quality of life and good human values.

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